SUPPLEMENT.

The Mining Journal,

RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

No. 1753.—Vol. XXXIX. LONDON, SATURDAY, MARCH 27, 1869. {STAMPED .. SIXPENCE. UNSTAMPED. FIVEPENCE.

The Royal School of Mines, Jermyn Street.

Mr. WARINGTON SMYTH'S LECTURES.

[FROM NOTES BY OUR OWN REPORTER.]

Lecture XL.—Having described the pillar and stall system, and other methods of getting coal based upon it, I now come (said Mr. Smyth) to that plan which may be said more or less to be in opposition to all those I have before alluded to—the broad way, or long wall system. It is so called because it is intended to remove the coal by a sort of sweeping arrangement, in which nothing is left behind. If conducted in a skilful manner, no pillars need be left behind, and though apparently connected with much risk, danger, and difficulty, it possesses many advantages, besides the cardinal one of taking out all the coal. Moreover, we shall find when we come to discuss modes of ventilation that that work is extremely simplified by merely having to keep open currents of air along one or two lines of level, instead of keeping those currents moving along a vast number of galleries. The circumstances of particular seams are so favourable to the method that in certain districts the system has been introduced from a comparatively early period. Such favourable circumstances may be advantageously considered as being—first when the seam is of no great thickness; secondly, when a considerable portion of it is rubbish, or material which has to be left behind, and thus provides a convenient means of preventing the roof from coming down suddenly. Then, the roof being of a character to come down by degrees, and having no reservoirs of water in the measures overhead, and no ground at the surface of much importance, having no houses or other edifices or buildings on it, are also circumstances to render the long wall system very advisable, and easy to carry out. Methods of working the long wall system may be carried out in two different ways—either by starting from the shaft towards the boundary, and getting the coal as you go on, or by driving to the boundary at once and getting the coal on returning home. It may, however, be taken almost as a general rule that the latter is the best, but it is not always feasible to practice it. There are some curious phenomena connected with work of this description, which have to be looked at. A few years ago it was considered impossible to introduce the long wall system into certain districts, as the men were decidedly adverse to its adoption, and particularly where seams are no thicker than 3 or 4 feet, and also when there was a great weight of superincumbent measures. All these difficulties being got over, its advantages appeared to be so great that it became important to have a fair comparison between it and other systems of working a given seam of coal. It will be well for this purpose to take a few examples of the varying forms in which this sort of work may be carried on. I mentioned to you in a former lecture the reasons why it was desirable to dispense as much as possible with narrow working to prepare the ground, as it costs so much more in proportion to the other workings in a colliery. A glimpse at the plan of a colliery on the long wall system [one exhibited] will show that narrow workings are almost entirely got rid of. It shows that in leaving the shaft pillars the whole is opened, and a face of working 25 yards in breadth carried on, the roads up to it being made by dry walling through the gob. There is, therefore, at once a large get of coal for the market. Take another case. Suppose we drove out to the boundary, and then began to get the coal in successive steps along a wide and extended face of working. The men are protected by two rows of props, and the roof is allowed to come down as they proceed. Sometimes three rows will be required, or it may be, if still stronger support is needed, that pillars must be built up of nogs or chocks of wood, 6 or 8 in. square, and from 2½ to 3 feet long, which make a very substantial support, and are put up with great ease and rapidity. As a general rule, there is the advantage in this mode of working, that as soon as the coal is got up to a certain line all the ground at the back is let down, and nothing remains but gob—a scene, in fact, of general smash, and the pressure is so great that in a little while no spaces are left for the accumulation of noxious gases; or if accidentally the debris falls so as to leave an opening, means must be taken to close it, and so leave the whole space filled with waste material closely pressed together. An advance of a yard a day in this way is good work, and if the roof falls with regularity right up to the space which is propped, there is neither difficulty or danger. In certain classes of work, however, the roof will sometimes be strong enough to stand for a longer time, and then it comes down with such a rush of air as to blow out all the lights, and, perhaps, carry away all the timber, placing the men at work at the time in great jeopardy. Indeed, the roof will often be found to differ much in the same mine, and that not only according to its geological character and lines of intersection, but also from variations in the amount of pressure. Something is also due in these cases to the form of working. It is found necessary occasionally to place the props so close to each other that a man can barely squeeze through, and then the removal of the coal becomes a costly matter, particularly if the tramways cannot be brought close up. Sometimes after the coal has been operated upon by holing and shearing, it adheres so strongly to the roof that nothing but gunpowder will separate them and bring it down. In other cases it may be broken off by wedges assisted by the pressure, but sometimes the latter acts so powerfully that the men can hole, and after leaving the place for a few hours return, and find all the coal fallen, and nothing for them to do but to cart it away. [Mr. Smyth then described on the board many of the details of the system, from which, he said, it would be obvious that where the circumstances were suitable it was an admirable system; but where difficulties intervened of the nature he had indicated, and particularly those connected with the roof, other systems were preferable.] In working from the shaft, instead of from the boundary, the principle is the same. When the day's work is done the props are moved forward a space, the hindermost row being placed at a similar distance in front. The roof then begins to break down, to meet which pack walls must be built on either side of the roadways. The walls will soon begin to give, the roof pressing strongly upon them, and the floor to heave, so that it may be necessary to cut the one, and raise the other. It will, however, be indispensable that the roads shall be carried through the whole waste, and the expense will depend much on the nature of the roof, and the precautions taken of throwing enough material back into the goaf.

The long wall system is carried out in Lancashire, Nottinghamshire, South Derbyshire, Shropshire, in certain parts of Staffordshire, and in the Forest of Dean. Its introduction into the North of England has only made any way within the last few years, but it is now adopted in some of the Northumbrian and Durham mines. It is largely used in Westphalia, Saxony, and Belgium, varying much, no doubt, according to the different thickness of seams, their inclinations, and local circumstances. Indeed, the forms into which the workings may be thrown, and the modifications of which the system is capable, are innumerable, and it is, therefore, impossible to lay down exact rules. The roadways up to the face of the coal, however, should not be more than 30 yards apart, as it is not desirable to have to drag the coal more than 12 or 15 yards.

We may now look at one or two other forms in which this sort of working is carried forward in various districts. In the Forest of Dean, on a seam of coal 11 ft. thick, which some years ago would hardly have been thought a suitable subject for working by long wall, two distinct systems are now in use, in both of which the necessity of driving narrow levels is got rid of. The roof at the face of the working is supported by props, and a slice being holed and taken down, the space kept for the roadway is packed on each side. The props being then taken away, the roof comes down, leaving the roadway to a pressure resulting in a heave of the floor, which has to be cut away, whilst the roof also has to receive similar treatment, so that half the roadway will be in the roof, the original coal being compressed sometimes from 5 or 6 ft. to 1 ft. If we have a bed of chert in the middle of a seam of coal, it is advisable to begin the holing in it. Thus, suppose we have a seam of coal of 50 ft., above that a layer of chert 3½ ft., and above that 3 ft. of coal, we must take out that beneath the chert first, and support the chert and top coal by chocks of wood, and then, as the bottom coal is removed, taking down that above close up to the chocks. By this plan in the Forest of Dean they get a smaller proportion of slack than they would by any other means. In Scotland the long wall system is largely adopted. It is generally deemed preferable there to trust to a pack wall rather than to coal for the roads, although the floor often heaves. The face of work often advances very irregularly, a good deal, probably, because of the irregular direction of the cleat, or, perhaps, because the coal works better on the end than on the face. The long wall system can be made so economical that in Somersetshire seams of coal as little as 30 in. are worked; indeed, I have seen a seam of 11 in. only worked by this method. For the same reason many of the pillar workings in Yorkshire have been transmogrified into the long wall system by advancing the bord-gates, and enlarging the faces of work. The great length of gob roads to be kept in repair has been the great objection to the change, but that has been got over by driving a few yards uphill, and working a portion to go to goaf, thus making the two systems work into each other. The long wall plan has latterly been adopted at the Monkwearmouth Colliery upon the celebrated Hutton seam. The shaft there is 280 fathoms deep, and the temperature being 80°, the difficulties of working are considerable, but, nevertheless, this system has been applied with success. Parallel roads are driven 30 yards asunder, and these roadways are 2 yards wide, kept open, and secured by pack walls. Thus, there is never more than 14 yards to carry the coal along the face to the wagons, and the men are protected chiefly by chocks, the pressure being exceedingly great. Although the character of the roof is such that it breaks down sharp immediately behind the back row of props, there is a much smaller proportion of small coal made by this system than by that of leaving large pillars. Besides which they are able to remove the whole mass of coal, and by its greater simplicity of plan the ventilation is more effective and more easily managed. Besides all these advantages of the long wall system, it is probable that it is far more secure as regards the lives of the men than other systems.

Lecture XLI.—The modes of laying out the workings of stratified deposits might occupy us for a very considerable time, if our limits would permit us to give them that attention which the importance of the subject deserves. If we have to deal with conditions different to those to which we are accustomed, everything will depend on the judgment with which we modify our plans. Thus you will have seen by what I have already brought before you that the whole security and success of the workings depend on the general arrangements first laid down, and then carried out, and although there is a great and broad distinction between the long wall and pillar systems, there are an immense variety of plans arising from the different thicknesses of the seams to be worked, and the conditions of the floor and roof in each case. One of the methods of working, of which I placed before you examples, is that in which the seams of coal are not very thick, but tilted at a considerable angle. This system is used very much in the coal fields of Northern France and Belgium, which, although they run through a narrow line of country, are of high importance on account of the number of the workable seams they contain, and of much interest to the geologist as well as the miner, on account of their peculiar contortions, in illustration of which I may mention that there are places in which a perpendicular shaft passes through the same seam three or four different times. In other cases a horizontal drift will, from the same cause, intersect a seam several times over. We have an analogous case in Pembrokeshire, where, a seam being inclined at a very high angle in some parts and in others at a low angle, it follows a zig-zig course, which, being intersected by a horizontal level, would be cut through a great many times. It is found there, however, as on the Continent, that in the steeper parts the coal is often so much squeezed as to produce so large a proportion of small that it is commercially valueless. At the same time, in those parts which are flatter the coal is of a good and valuable quality. I do not say that this will always be so; every case must be examined for itself, but it very frequently happens that where there is much pressure half the coal is of little value. Conditions of this kind require peculiar systems of working to suit them. If a seam be tilted at a very high angle, a system adopted in the North of France, Westphalia, and parts of Belgium may be introduced very satisfactorily. It is based on the long wall principle, but cannot be worked so cheaply, because it requires a larger quantity of timber to be employed to keep the men in anything like security. Struts and longitudinal pieces are put in, and behind them a quantity of brushwood, which in Somersetshire, where the plan is also adopted, is called "rice," to prevent the easily fractured wall from breaking in on the men. As an example of tilted seams, I may mention that of Haynichen in the Saxon coal fields. The forebreast is 2 yards high, and the level about thrice the ordinary size, and thus a space is opened out, supported by struts here and there, and as much rubbish is made the men throw it under their feet and stand on it to work. If this is not sufficient temporary platforms are put up for that purpose. These heaps of rubbish are made just so steep that the men, with the aid of a plank or two, can climb up them. To get the coal down small openings are left through the attle, which are lined with timber, and fitted with a sliding door of wood. The wagons are then brought underneath, the sliding door is removed, the coal runs down, and fills the wagon when the sliding door is replaced. The full wagon is then taken away, and an empty one put in its place, and thus the work goes on with great rapidity. This is, in fact, a variety of long wall working, because as fast as they remove the coal they bring up the face of the goaf.

In working seams of extra thickness the problem becomes more difficult. I had an opportunity not long ago of seeing a very fine example of long wall system applied to a seam of no less than 15 ft. in thickness. It was at Church-Gresley, on the "main coal," a most magnificent seam, which is worked by one operation. It is holed at the bottom, and the workings at first are conducted so as not to take the whole of the seam, but when the lower working gets away from the face the pressure from above brings down the upper part of the seam. It is good coal from top to bottom, and this example sets at nought the objection brought against working by long wall broad seams which do not contain a band of refuse in the middle. Beyond a certain short distance of face, however, the men are in such cases greatly exposed to the risk of the roof falling in on them. This makes it requisite that the nature of the roof should be examined, and stack pillars put in occasionally. This plan is of great importance where bands of ironstone exist above the coal, as in South Staffordshire, where they work the two minerals together. If we go to seams of still greater thickness—say, 20, 30, or 40 ft.—the problem becomes still more difficult in practice, as, for instance, the magnificent "Ten-yard coal" of Dudley, which varies from 25 ft. to 36 ft. in thickness, and where special methods of working are required. In the Centre and towards the South of France it is remarkable that the seams run to a great thickness. They do not extend over so large an area as our seams, but have been so contorted by nature as to be extremely difficult to work. One of the most interesting of the collieries on these deposits is that of Creuzot—a remarkable districts in other respects from its competition with our iron trade, almost beating us in our own markets for cheapness. I have already mentioned to you the deep bore-hole which has been sunk at that place. The principal seam of coal there comes up to the surface like a perpendicular wall, bounded on one side by a mass of granite. It seems at first as if the coal dipped under the granite, which for a time gave rise to some heteredox notions as regards geology, but, following it down, it was found to turn away from the granite, and to open out for some hundreds of yards, with great "bulges," 80 ft. from wall to wall, of a very useful coal for engines. It is at last cut off by a fault, and re-appears in the district of Blanzy, some miles distant. The seam there varies from 30 to 80 ft. in width, and it is worked in a very peculiar manner, somewhat similar to the system of cross working in the case of lodes of unusual width.

Other remarkable thick seams have been discovered at Saarbrucken, in Prussia, and at a place called Zabize, in Silesia. In the French district the work was easy enough as long as it was done by means of an open cast, but as soon as they got down to a certain depth great difficulty was experienced. As long ago as the days of the first French Republic some officers were sent to examine into and report on the best method of working the seam. Their report is a valuable document, but the system they recommended is not suited to the large scale on which the works are now carried on. The thick seam of South Staffordshire is yet, however, the most noted in Europe, not only on account of its thickness, but for its excellent quality, especially for the manufacture of iron, and for its extent, which takes in the whole district from Wolverhampton to Birmingham, and is the main stay of all the industries of Mid-England. The mode of working it is very simple. The usual plan is to sink the shaft down through the granite, and to the bottom of the seam. The first workings are driven out from the bottom of the pit, which is called a gate-road, and is 8 or 10 feet high. A small air-way is carried along with it, at a distance of 2 or 3 yards, to ventilate it. A person named Ryan received a medal from the Society of Arts for the simple proposition of putting in the air-way at the top instead of at the side of the gate-road; but the plan does not appear to have had much value. From the gate-road an opening called a bolt-hole is driven, and an excavation from 60 to 80 yards wide is made. This space is worked out by first taking 8 yards, and then leaving 8 yards, the pillars being irregularly dispersed, according to circumstances. This is called square work. The gate-road is carried on, and by means of another bolt-hole another space of 60 to 80 yards wide is excavated. It is designed by this plan to take away as much of the coal as possible at first, and then to rob the pillars afterwards, until the roof begins to come down. A large amount of small coal is made in holing, so that these large spaces are filled up by the time they are worked out. When this is done the men go out by the bolt-hole, in which they place a strong dam of earth or other material, so that if any gas arises from the slack or roof in this abandoned space it cannot ooze out into the other workings. The slack has a tendency to take fire, emitting at first a sooty smoke called "fire-stink," but by shutting off the ventilation by means of the dam just mentioned, all danger on that score is avoided. This is a very wasteful mode of working, and it is calculated that out of 30,000 tons per acre only 11,000 tons are got. It must be remembered, however, that there is some notion of getting the rest at some future day, and that when the first working over the ground is completed, another set of persons may take it, and proceed to extract what they can from the pillars or walls. It generally happens that the coal in mines abandoned in this way is found to be so squeezed that it is of little value. Some years ago it was proposed to work this seam in steps, but this plan has not been tried. Another system used in large seams is attended with much more security to the men. In the first operation they hole in the middle, and open out a sufficient space, pack walls being built up at intervals 10 or 12 ft. wide, and by this means the whole of the upper portion is obtained. When they have advanced over a certain area the roof is permitted to come down. A year and a half or two years is allowed to intervene, and then the lower half is attacked in a similar manner. Strange as it may seem, the roof is found to have become so firm and compact that the men are able to work with but very little more trouble than when the roof was in its original position. A little more timber also is required. This practice has been adopted by the large proprietors in Staffordshire with great advantage.

Another remarkable success of this kind has been achieved at Blanzy, the system being, like that at Dudley, a sort of compromise between pillar and long wall working, but it is to be noted that an unusual number of men have been killed by falls of roof, and which is not to be wondered at, as the seam is 40 ft. in thickness. The seam in this case runs at a low angle, and a shaft is sunk down on one side; levels are then driven out to cut the seam—a plan somewhat resembling the iron mines in the Ulverstone district. The ground is cut in stages 4 metres high, the intermediate ground being laid out in pillars 10 yards square. The openings between are of a very moderate size, not more than 6 ft. or 8 ft. in width. The ground being worked out in this way, they then begin to remove the pillars in slices; at the same time another set of men are continually introducing rubbish, clay, &c., brought down from the surface. This is the mode of working *à remblais*, and the men are called "*remblayeurs*." The colliers work from 4 to 12 o'clock; then the *remblayeurs* come in and pack in the rubbish between the floor and the roof. Thus the ground is gradually replaced as the coal is taken out. I confess I was surprised to see this done with security, because when the first stage of 2 metres has been cut away it would appear at first sight almost impossible that this artificial roof could stand. It no doubt requires great smartness on the part of the men, but they assured me that they worked more securely under this compact mass of clay and rubbish than under the natural roof, providing it has been subjected to the pressure of the superincumbent measures for not less than 12 months. The same system has been introduced at St. Etienne and other places in the South of France where thick seams occur.

Mr. Smyth concluded by stating that the students would have these different modes of arrangement more fully represented to the eye if they examined some of the larger models in the Model Room, mentioning particularly one presented by the late manager of Hetton Colliery, which was laid down to scale. The model of the Dolcoath Mine, although made many years ago, fairly showed the arrangements relative to shafts; while the large models in the Western Model Room, admirably constructed by Mr. Woodward, showed the system of long wall practised in Nottinghamshire, with the timbering, pack walling, and so on. He must not omit to mention also a model which stood in the same room, representing those great ironstone mines of the Cleveland district, of which he had spoken in some of the previous lectures.

Lecture XLII.—When we turn to the next subject in mining (said Mr. Smyth) which demands attention, we come to one of a mechanical character, belonging rather to general engineering than to mining, but in respect to which the mining engineer should have an acquaintance of the different methods practised in the various districts. If we were to go into all the details of carpentering and blacksmith work which come into play in mining, the course of lectures would be protracted indefinitely, and although it is not the business of the mining engineer to do such work, it is not a bad thing in new countries to be blacksmith enough to make a horse-shoe, and put it on himself, and so in all countries he ought to know practically what can be done by the blacksmith and carpenter. My province, however, is only to give a historical review of the improvements that have taken place, or which have been proposed in reference to these things. I propose to-day only to place before you the general arrangements made in transporting the mineral from the working places to the place from whence it is raised through the shaft to the surface—what we simply call "underground carriage" or "transport," but for which the Germans have a special technical term—"Förderung." In the earliest days very simple means were used, such as baskets or sledges, and unpractical as such things appear at first sight there are cases in which they must be used even now, as, for instance, where at starting a more complete system cannot be introduced, or where difficulties occur in any part of the workings. If we cast our eyes on the plan of a metallic mine, if it be a mine of any considerable size, we shall find railroads established in the main levels, but the mineral will have to be brought from the face of the workings, and either dragged or carried to the place where it has to be thrown down to the level through the "shoot" or "passes." If the ore be mixed with other material from which it is to be separated, the attle will have to be taken by some such means to one pass, and the ore to another. Rails are very rarely carried up to the face of the working, even in pillar workings, and the coal has to be dragged along on a sort of sledge to the main road, where it can be placed upon carriages, and passed away to the shaft. One of the most remarkable instances of this sort of work at the present day is to be found in some few mines where the mineral is carried on the shoulders of men. Twenty years ago it used to be very common in certain collieries in Scotland for this sort of work to be done by women. This, however, was stopped by Act of Parliament so far as collieries are concerned, but the system still exists in certain ironstone mines, where the run of the ore is extremely irregular. Thus the deposits of this kind in the carboniferous limestone may suddenly open out into a large churn, but the exploratory level by which it is reached will not admit of its removal by any other means than by carrying it on trays on the shoulder to the main level. There are many places in which it has to be carried up ladders in this way, and in which it will be, if not impracticable, certainly unprofitable to adopt any other mode. In the extensive mines of South America carrying on men's backs is very frequent, and it is surprising what considerable weights the Indian labourers will remove in this way along difficult paths. From ½ cwt. to 1 cwt. in our Forest of Dean is a common load, but as much as 2 or 3 cwts. is frequently carried by these Indians a considerable distance, and up steep ladders, which would puzzle ordinary men to get up without a load, being simply tree trunks with notches cut in them. In the Museum there is a large mass of silver ore brought up ladders of this kind a distance of 45 yards by a Chilian labourer on his back. A good deal depends, in some countries, in matters of this kind upon the prejudices of the people. Thus, in Spain there is a strong tendency to carry everything in small baskets on the shoulder, and so in the mines this system is preferred to any arrangement of wheelbarrows or wagons. Even when the mines are worked by English companies this prejudice is deferred to, and the ore is carried in baskets of Esparto grass, a very cheap and suitable material. Besides the more obvious objections to this system, it leads to a considerable amount of danger, as the baskets are exceedingly inflammable, and the Spanish miners are not careful to remove them when worn out, but cast them down by the sides of the level, and replace them with new ones. Thus, if a fire did occur it might be conveyed with great rapidity along the levels, and greatly increase the damage.

The next step beyond this is drawing the material along in sledges. This was much practised some years ago, especially in seams of coal that had the floors of the levels formed by beds of clunch, which, though tolerably hard, was slimy and smooth, and frequently the principal mode of conveyance was by such sledges drawn by horses. At present, however, such conveyances are only used for small distances, as, for instance, from the face of work to the rails. In cases where the seam is narrow (say 2 ft.), the workings are often of that height only, and, consequently, would not admit of a horse. Branch roads are often cut out higher, and the main roads still higher, but they require much more timber, and it is frequently preferred, therefore, to avoid constructing these, and pulling out the mineral on small sledges by lads, who have to work in a painfully cramped and awkward position. These sledges are often composed of iron, in the shape of a large bowl, to which the lad is harnessed by a rope fastened to a strap passed round his chest. The first steps of improvement on this were made by the Germans and Hungarians, who, instead of sledges or ordinary wheelbarrows, adopted a wagon with four wheels, called the "hund." This is still largely used, especially in the gold mines of Hungary. The wheels are from 6 to 8 in. in diameter, made of wood, with tyres of iron. The principal point about them is that the wheels are so placed that the centre of gavity is nearly over the larger pair, so that with the slightest push the "hund" is set going. The wagon, of

course, runs on the two larger wheels, upon the planks which are laid along the roadway for the purpose. The "hund" is difficult to steer, but the Hungarian miners acquire considerable dexterity in the management of it, and do good work with it.

Original Correspondence.

ON THE COAL COST OF STEAM POWER.

SIR,—With your permission, I desire to give the public the following additional evidence upon this subject, which is for the most part derived from the reflections and experiments of others upon my invention. On turning to the "Engineer" of Dec. 4, 1857, p. 418, it is seen that, fortified by a number of indicator figures taken by me off the engine in the Thetis, with the coal also weighed, so that I was able to see clearly what that engine would do when the defect in the valves was rectified, I am found replying to "J. B." in the following words:—"Whatever may be "J. B.'s" and other men's speculations upon the subject, I know as certainly as I know I write these lines, that the engine and boiler are capable of working with 1 lb. of coal per horse power per hour." On the 20th of the next November we have Prof. Rankine confirming this by the following:—

CIRCUMSTANCES OF THE EXPERIMENT.—At 10·25 A.M. the steamer (Thetis) started from the quay at Greenock, with the pressure in the boiler at 80 lbs. per square inch above the atmosphere, and soon attained her full speed. The pressure continued steadily to rise, and at 11·20 had reached 101 lbs. per square inch. At 11·30, the pressure being about 115 lbs. per square inch, the condition of the fires was carefully observed, the stoke hole cleared of coal, the coal bunkers closed, and 448 lbs. of coal, which had previously been carefully weighed on deck, were sent down in sacks for the supply of the fires during the experiment on the consumption of fuel, which was held to commence at 11·30. During that experiment, and for a considerable time after its termination, the pressure (except during an interval, when the dampers were closed, to be afterwards specified) never fell below 112 lbs., nor rose above 125 lbs. on the square inch, and in general remained steady at 115 lbs. At 12·30 the dampers that regulated the admission of air to the fires were shut, the engines stopped, and the experiment was held to have closed, exactly one hour after its commencement; but, as the fires were lower than they had been at 11·30, they were again fed at 11·42 (the dampers being then opened, and the engine started), so as to bring them into as high a condition as they were at 11·30, and the coal so used was included in the consumption of the coal burnt during the experiment on the combustion. The coal remaining on the floor of the stoke hole was then sent on deck, and weighed, and found to amount to 218 lbs., so that 230 lbs. had been used during the experiment of one hour in length. During, and for a considerable time before and after, the experiment the speed of the engine never fell below 40 nor rose above 53 revolutions per minute. A leakage of steam took place from the stuffing-box of the slide-valve rod, but for this it was impossible to make any allowance. The steadiness both of the pressure and the speed for a considerable time before and after the experiment showed that the performance during the experiment was no extraordinary effort, but a fair trial.

POWER OF THE ENGINE.—The horse-power of the engine, as indicated by a series of diagrams taken during the experiment, varied from 221 to 231, the mean being 226.

CONSUMPTION OF COAL.—The coal burned in one hour, as ascertained as already described, with every precaution to make the fires as high at the end as at the beginning of the experiment was 230 lbs., being at the rate of 1·018 lb. per indicator horse power per hour.

CONDENSATION.—The surface condenser acted perfectly, maintaining a steady vacuum of 13 lbs. per square inch. It is the most satisfactory example of surface condensation that I have seen.

(Signed) W. J. MACQUORN RANKINE.

59, St. Vincent-street, Glasgow, Nov. 23, 1858.

In my letter at page 55 of this year's Journal, Mr. John Seaward's paper of 1849 is referred to as a fair standard of comparison between the economy of the practice mine is superseding and itself. And be it remembered that, except in so far as my basis is adopted, Seaward's paper is as applicable now as in 1849. The following table presents at a glance all the most important practical points: these are economy in coal, in bulk and weight of machinery, and of the water in the boiler, also the capacity of cylinder for a given power. Professor Rankine's experiments upon my boiler and Randolph and Elder's common boiler give 13·56 lbs. of steam, and 7·27 lbs. of steam, as the respective quantities per 1 lb. of coal. The common, or Seaward practice, is presented at full pressure, as the best possible to give it the advantage in point of cylinder capacity. Yet the Thetis engine, with the steam cut off at 1-15th of the stroke, gave the same average pressure on the piston, and, consequently, the same power with the same capacity of cylinder and the same revolutions per minute, but the Thetis engine reduced the coal from 7 lbs. at the least to 1 lb. per horse-power per hour. But the instant the Seaward practice attempts expansion the cylinder capacity for the same power increases enormously. Yet increase the pressure and expansion with my engines, and the same power is got with even less coal and smaller cylinders than in the Thetis.

COMPARATIVE TABLE, with 130 lbs. absolute pressure in my boiler, and the Seaward or 25 lbs. absolute pressure in the common boiler.

	Common practice.	My practice.
Cubic feet of space occupied by steam cylinder for 500 h. p.	Same	Same
Cooling surface of steam cylinders of 500 h. p., in square feet..	Same	Same
Cubic feet of space occupied by boilers of 500 h. p.	6624	1666
Relative heat absorbing surface of boilers, to coal burnt, ditto	10	45
Relative grate surface to coal burnt, ditto	2	5
Weight of 500-horse engine ..... Tons	105	76
Weight of boiler ditto	78	36
Weight of water in the boiler ditto	48	6
Coals for fourteen days' steaming, ditto	525	75

Nothing more requires to be said upon the above table; but on turning to the "Engineer" of Nov. 5, 1858, p. 358, it is there found stated in a leader that every ton of coal saved in a voyage between England and Australia is equal to a gain of 9*l.*—the cost of the coal is set at 3*l.*, and the freight at 6*l.* From this it is easy to see the worth of the invention between England and Australia, and to see that my table statements of 1847 are fully realised by the economy of the invention. Let us, therefore, again see what others have had to say. On turning to the "Engineer" of June 11 and 18, 1858, pp. 445 and 463, are two leaders on the long discussion upon high and low pressure steam; in those leaders is found the following:—

Mr. Craddock (Jan. 15) ascribes the observed fact of the condensation of the steam within the cylinder, and its re-evaporation, to the cooling and heating of the metal of the cylinder; indeed, he appears to have arrived at this conclusion on the subject as early as 1845. As the self-destructive process now described constitutes really the cardinal defect of most of the attempts to economising by expansive working, it is desirable to throw as much light as possible upon the subject (page 463). But the prime condition for economically working steam by expansion is to be found in the means for preventing condensation within the cylinder by contact of the metal surfaces by supplying heat to prevent the condensing process, as when there is no condensation there is no subsequent re-evaporation, Mr. Craddock (Feb. 19) prefers in practice to supply the extra heat in the steam itself by superheating it (see page 71). Of this we are persuaded, that there is more in steam and the steam-engine than is dreamt of by most engineers, and that for most of us it would be better to be less dogmatical and self-seeking, and more open to the instruction of those who, as natural philosophers undertake, and successfully, too, the investigation of first principles. Practical men—that is, the men who apply mechanics in practice—are by the nature of their vocations and by their habit of mind generally but imperfectly qualified to investigate, and it becomes them neither to despise, nor treat with indifference or neglect, the necessary and invaluable labours of their scientific coadjutors. That the steam-engine is open to improvement, and that it may be very much improved, too, is unquestionable, but we must have a little more science infused into the current of progress as a flux to reduce to order and consistency the heterogeneous mass of practice, and to distinguish the true from the false. We congratulate our readers and correspondents on the benefit that has accrued to the profession from the free discussion of the question of steam-power in your pages, and we confidently anticipate an advance in the practice of engine builders. Engineers must attend to what lies next them to be done; they have to probe the action of the steam within the cylinder to satisfy themselves of the injurious precipitation and re-evaporation of the steam neutralising the efficiency of expansion, to apply and mature the means of preventing such condensation of the steam by the application of additional heat to the steam externally through the cylinder, or internally by superheating it, and to ensure an economically good vacuum in the condenser. They must further see what is to be done in expansive gear, to test the imperfections of the link-motion, if such there be, and to compare the advantages of independent expansion valves, also to equilibrate the steam-valves, so as to unload them of the injurious pressure of the steam, and relieve them of such injurious pressure to avoid excessive friction."

Let what appears in this letter, as written by others with certainly no intention to serve me, be considered with what appears in your Journal, 1867, pages 370 and 426; and 1869, pages 54, 74, and 107, and if my case is not made clear, sound, and good no case ever was, or can be made so, as were one to arise from the dead to attest it, it could not be more clearly established. But I may refer the reader to your Journal of 1845, page 426, as there he can see two indicator figures, which were in 1844 taken off my double-acting air-pump; and by referring to the "Engineer" of, I think, March 5, 1858, page 189, he can see two of the indicator figures, which in 1844 were taken off the steam-cylinders of my engine; and if he refers to your Journal of June, 1848, page 298, he finds an account of the portable engine and the 4-horse engine; and in 1855, at page 603, I think it is, he will find an account of the sawdust boiler and steam-power; and if he desires more information still, he may find it in three letters in the "Mechanics' Magazine," Jan., 1860, pages 40, 54, and 127; and he can also go to the "Artizan" of 1859, page 201. The last reference given in the first paragraph of my letter on page 107, 1869, should be 1869, not 1859.

THOMAS CRADDOCK.

44, *Friston-street, Birmingham.*

[For continuation of Original Correspondence, see this day's Journal.]

Meetings of Public Companies.

ECONOMIC LIFE ASSURANCE SOCIETY.

The annual court was held at Radley's Hotel, New Bridge-street, on March 20,—Mr. HENRY BARNETT, M.P., in the chair.

The notice convening the annual court was read.

The following statement of accounts for the year ending Dec. 31, 1868, was submitted:—

GENERAL ACCOUNT.

Received—Assurance premiums	£223,078	11	11			
Less commission	7,648	17	5	= £215,429	14	6
Interest on investments	107,008	5	4			
Less income tax	2,574	4	2	= 104,434	1	2
Registration fees				48	15	0
Total				£319,912	10	8
Paid—Assurance claims				£205,187	9	0
Annuity claims				2,325	10	0
Policies purchased				6,168	9	0
Re-assurance premiums				324	16	4
Office expenses				9,696	7	5
Law charges				760	14	7
Medical fees				252	10	6
Balance carried to investments				95,196	13	10
Total				£319,912	10	8

ASSURANCE FUND.

DR.—To balance, January 1, 1868, consisting of—						
Funded property	£ 513,639	12	1			
Mortgages	1,683,662	0	8			
Loans on policies	127,491	10	0			
Reversions	118,379	7	6			
Life interests, &c.	57,761	3	5			
Cash on hand and on deposit....	21,702	8	2	= £2,522,636	1	10
Profit on reversions fallen in, and on re-valuation of securities				16,566	0	4
Balance from general account				95,196	13	10
Total				£2,634,398	16	0
CR.—Re-valuation of securities				£ 14,171	13	0
Terminable annuities				1,695	7	6
Balance, December 31, 1868, consisting of—						
Funded property	£ 539,013	2	5			
Mortgages	1,744,185	0	4			
Loans on policies	134,650	10	0			
Reversions	113,144	1	4			
Life interests	60,321	7	2			
Office premises	13,921	0	0			
Cash on hand	13,296	14	3	= 2,618,531	15	6
Total				£2,634,398	16	0

AUDITORS' REPORT.

Economic Life Assurance Society, London, February 10, 1869.

The auditors of the Economic Life Assurance Society having carefully examined the accounts laid before them, do report that they are correct. They consider it impossible to enter into all the minute calculations of the actuary, as to the assets and liabilities of the society, but are satisfied with the principles adopted in preparing those calculations, and the preparation of which has been attended with great labour. Comparing the present with the preceding quinquennial audit, they are able to assure the members of the continued prosperity of the society.—JOHN HOWELL, RICHARD TAYLOR, HENRY ROBERTS, Auditors.

The CHAIRMAN said it was customary at these quinquennial periods to let the proceedings of the annual court to pass by without comment, in order to have the whole of the business before them at the quinquennial court; but at the same time the directors were only too anxious now, as upon every occasion, to afford every information in their power to any policyholder who may desire it. He then moved that the statement and report be received and entered on the minutes.

The Right Hon. E. PLEYDELL BOUVERIE, M.P. (Deputy Chairman), seconded the proposition, which was put and carried unanimously.

The sum of 160*l.* was awarded to the auditors for their services during the past year, and the auditors were re-elected.

An extraordinary court was then held, when Mr. A. Buckley was elected an auditor in the place of Mr. Henry Roberts, elected to a seat at the board.

An ordinary quinquennial court was then held.

Mr. JOHN R. GRIMES (the secretary) read the following report:—

The directors have the satisfaction of presenting to its members a report of the affairs of the society, as they appeared on Dec. 31, after a full investigation of the business during the preceding five years, which complete the ninth quinquennium. Since the last division, in 1864, 2266 policies, assuring 2,062,573*l.*, have been issued, giving an annual average of 453 policies, of 910*l.* each. During the last five years the sum of 66,630*l.* has been received in new premiums, being at the rate of 13,326*l.* a year. The total income from premiums, which in 1864 was 214,104*l.*, now amounts to 228,833*l.*, indicating an average annual increase of 2946*l.*, after allowing for loss of income from discontinued policies; while the gross income from all sources has increased at the rate of 6100*l.* per annum. Claims have arisen during the five years on 1037 policies, assuring 841,303*l.*, and carrying bonuses to the amount of 198,089*l.* These claims are 41,134*l.* in excess of the expectation. In addition to the bonuses on policies upon which claims have arisen, the sum of 83,864*l.* has been paid as bonus in various other ways, such as in reduction of bonus liability by cash payment, reduction of premium, purchase, &c., making a total of 281,953*l.* In the valuation of the assets, a sufficient margin has been allowed, as on former occasions, for a possible fluctuation of the public securities; and in regard to the liabilities, so much only of the premiums has been taken into account as represents the actual risk of life. The remaining portion provides for the expenses of management, and accumulates to form the surplus to be dealt with at the future divisions of profit. By this arrangement, old and new assurers contribute rateably to the expense of management, and no profit is declared by anticipation. The assets, consisting of funded property, mortgages, life interests and reversions, the office premises, premiums due on Dec. 31, (since paid), interest accrued on investments, balance at bankers and in hand, amount to 2,665,544*l.* 12*s.* 3*d.* The liabilities, consisting of the values of policies and the bonuses already declared, claims accrued in 1868 but due in 1869, commission, taxes, and sundry small accounts, amount to 2,336,870*l.* 17*s.* 6*d.* There is, therefore, after making provision for every known liability, a surplus of 328,673*l.* 14*s.* 9*d.* The directors recommend that 308,673*l.* 14*s.* 9*d.* of this surplus be appropriated as absolute bonus in reversion; and that the remaining sum of 20,000*l.* be retained for the payment of annual, contingent, and conditional bonuses. It is further recommended, that out of this sum of 20,000*l.*, an annual contingent bonus of 1*l.* per cent. per annum be added to the absolute bonus on such policies, now entitled to participate, as shall become claims during the current quinquennial period:—

On policies which become claims in 1869, 1*l.* per cent. on sum assured.
" " 1870, 2*l.* " "
" " 1871, 3*l.* " "
" " 1872, 4*l.* " "
" " 1873, 5*l.* " "

To the policies which are not entitled to participate in the present bonus, by reason of five annual premiums not having been paid upon them, but on which claims may arise after the payment of the fifth annual premium and before the next quinquennial investigation, the directors propose to add a bonus of like amount as if five annual premiums had been paid prior to the present division. The sum of 308,673*l.* 14*s.* 9*d.* will produce reversionary bonuses amounting to 464,816*l.*, yielding a percentage ranging from 4 to 31 on the sums assured; and a percentage ranging from 22 to 189 on the premiums received in respect of which the bonus is allotted. The same options are offered as at the last division, and so the bonus at present added may be commuted, either to a present money payment, to a reduction of the premiums for five years only, or to a reduction of the premiums for the remainder of life. The society now assures by 9576 policies the sum of 8,670,625*l.*, and has an assurance fund amounting to 2,618,531*l.* 15*s.* 6*d.*, and an annual income of 338,000*l.* The directors regard the state of the society, both with reference to capital and income, as well as to the working expenses, as highly satisfactory; while the large number of assurances in force forms an adequate protection against loss from any deviation from the average rate of mortality. In closing this report, the directors beg leave to congratulate the policy holders on the condition of the affairs of the society as now set forth, and at the same time to impress on them they are all personally interested in endeavouring to extend the business of the Economic Life Assurance Society.

The CHAIRMAN said it became his duty to move the adoption of that report, confidently believing it would be assented to with great unanimity. (Hear, hear.) The period elapsed since he last had the honour of addressing one of these quinquennial meetings, however eventful to them as individuals, had not, he was glad to say, been so to the Economic Society; but he should like to review that period, the result of which had been submitted in the accounts presented. He regretted to state that within the last few weeks they had lost a director, whom all valued very highly—he referred to Admiral Gordon, who was a very able and high-minded man, and who took great interest in the society, in consequence of having been auditor for many years, and connected with the society from its earliest period. The directors had thought it right to invite Mr. Roberts to take his place. Mr. Roberts had been for several years an auditor of the society, and was a gentleman, from his position and acquaintance with assurance business, eminently qualified to promote the interest of the society. Turning to the accounts, he might say that the investigation of the assets and liabilities had been made upon the same principle as before, and upon the basis laid down by the Deed of Settlement. If in some items there was a decrease, in others there was an increase; but with regard to the figures, which had given some little doubt as to the continued prosperity of the society, they could be easily explained—at all events, he was quite satisfied there was no cause for doubting that their calculations were sound, and that the position of the office was as safe as regards its security as it ever had been. (Hear, hear.) The real ground for the decrease in some portions of their business was attributable to ordinary natural causes—that during the five years there had been a period of very great commercial depression. The crisis in commercial matters in 1866 had undoubtedly crippled the resources of commercial men, which was the class whom they looked to as anxious to provide for their families by life assurance during the time they were making large incomes, with the view of retiring in the course of time from those labours. They did not apprehend they had suffered any serious loss from the competition of other offices—no doubt competition had gone on, but, as far as this office was concerned, they had gone on in the even tenor of their way, and had not deviated from their path to attract business which might be of a doubtful character. (Hear, hear.) As to the fluctuations, they had been nothing more than they must expect, particularly as they were with averages. He had taken the liberty of drawing attention to this circumstance before, that although the word average implies change in individual circumstances, yet that they show certain results may be expected in a lengthened period of those changes. The figures before him showed on this subject that the policies issued in the preceding five years had been 2267, while during the quinquennial period ending 1863 the number was 2641—they had completed 375 policies less during the last than the former quinquennium. The average annual number had been 453, against 528, showing also a decrease in business to a certain extent; but, on the other hand, the annual average amount of policies had been 991*l.*, against 777*l.*, showing that the class of business was improving, the total amount assured during the same time having been 2,063,573*l.*, against 2,050,788*l.* during the former quinquennium. (Hear, hear.) The new premiums had been, undoubtedly, less; but the total premium income had risen from 14,000*l.* in 1863 to 22,900*l.*, which it was at the end of the year just closed, which showed that they were still progressing, although they had not had such a large share of new business as before, which, as he had already said, was probably to be attributed to the commercial crisis of 1866. As the influence of that depressed period passed away they may again see the business progress as rapidly as it had hitherto done from time to time. At the same time, however, it was not right to reckon upon a continual flood, as there must be the ebb as well as the flow of the tide, and, therefore, they must be content to see the water still standing higher than it did before. (Hear, hear.) The gross income from all sources had increased to the extent of 35,000*l.*; and as to the claims, there had been what actuaries call rather a "high wave of mortality." It now happened for the first time that the total amount of claims during the five years had been in excess of the expectation—hitherto they had gone on wonderfully well, the duration of life being greater than they might have anticipated, but this year it had, undoubtedly, changed, as they had paid 41,000*l.* more than expected. On the other hand, there was a consolatory circumstance even to be coupled with this—that although during the five years the amount was 90,000*l.* beyond their expectation, yet that up to within the last half of that period it had actually been 140,000*l.* This was but another instance that the tide ever ebbed and flowed, and, therefore, that there was every probability that, during the next quinquennium, the mortality would be below their calculations. As to the expectation of claims, it must increase upon them—it was in the nature of the constitution of the society that it should be the case. He thought it almost marvellous to be able to state that during the last five years a society of this kind had been enabled to pay the public, in discharge of claims, not less than 1,040,000*l.*, and that there was still a surplus beyond that amount of 328,000*l.* The claims expected during last year amounted to 196,000*l.*, whereas the amount accrued was 16,000*l.* more than expected. Mr. Downes calculates that in the current year they might expect to have as much as 215,000*l.* besides on new bonuses. He thought the policy-holders would not be altogether discontented with this statement; for his part, he was quite satisfied that the low premiums charged, and the solid basis upon which this office stood, having been before the public for so many years, will attract business to them. (Hear, hear.) During the past five years a good many ephemeral insurance offices had sprung up, and disappeared, and small offices had gradually merged into others; but the Economic had gone on in its steady path, as of old, still holding out every inducement in the shape of low premiums. The bonus paid upon some of the older policies which have fallen in must have been most satisfactory to those who were the recipients—no less than 189,000*l.* had been paid in bonuses upon claims during the last five years, whereas in the previous period they were called upon to pay only 116,000*l.* They had also paid in cash, on reduction of premiums, and in ready money bonus, 83,000*l.*—this last year they paid upon one policy 2000*l.*, and a bonus of 1669*l.* The policies now in existence amount to 9576, assuring the large amount of 8,670,625*l.*; that seemed a large sum, but, at the same time, the value of these policies, calculated at the present time, was 2,636,870*l.*, against which they had the assets, amounting to 2,665,544*l.*, showing a surplus of 328,673*l.* They had put by 20,006*l.* to meet the contingency bonus which they gave upon policies falling in during the next five years, and they proposed to divide the residue amongst the policyholders in the same way as before. The insurance fund was invested in the safest possible manner; they had always gone upon the principle of seeking rather to get small interest with good security than high interest with indifferent security, and in acting upon the suggestion made at the last quinquennial meeting the directors had turned their attention to that subject, and they had been able by carefully investing their money to rather increase the rate of interest usually made upon their funds. At the same time, they could not expect to raise it beyond a certain amount, because it was absolutely necessary in any great concern of this sort that a certain amount should be kept in Government securities, convertible at a moment's notice. Care had been taken to keep such a sum so invested, and the directors thought it right and prudent to seek for, and had obtained, investments upon mortgages, rates, land, and such other securities as they were entitled to by their Deed, and by which investments they had succeeded in realising a very satisfactory income. The working expenses were by no means extravagant, although no expense had been spared to have the business of the office properly and well done. But they had not launched out into a mode which he was told was adopted by some offices, by being very lavish in paying enormous commissions. By thus getting business was equivalent to lowering the premiums. If they went beyond a certain line they would upset the calculations upon which the whole business of the office was founded. The whole of the office expenses were under 2*l.* 18*s.* 6*d.* per cent., and including everything, they came to a little more. Of course they must pay a certain amount of commission to their agents, and the amount thus paid during the last five years was 38,000*l.*—that is, as ordinary commission, and 10,000*l.* had been paid in the shape of income tax. It was of no use for him to dilate upon the general advantages of life assurance, but he hoped the policyholders would, upon the whole, be gratified by the report the directors had been able to present. All he could say was that the directors were unremitting in their attention to the interests of the society, and were most anxious to receive any suggestion which may lead to an increase in the business upon sound and safe terms. The directors confidently place this report before the policyholders, feeling convinced that it would be accepted as rendered, as a most satisfactory one. (Hear.)

Dr. DALRYMPLE wished to know whether any change was contemplated in the policy of the office in granting facilities to policyholders to pass the winter or a portion of the year out of Europe, without imposing a fine of 10*s.* per cent. on the sum assured?

Mr. TULLOCH urged the settlement of claims arising upon policies without the delay of six months, and also the removal of some of the restrictive conditions now required, but which experience showed were no longer necessary.

Mr. GEDGE thought that the accounts and report would be better circulated two or three days before the meeting.

Mr. PRESTON complained of the decreasing rate of bonus upon the old policies.

Mr. BARRON recommended 30 days' grace instead of 15 for payment of premiums, and a more early settlement of claims.

Mr. SPRAGUE preferred that they should remain as they were, as by submitting to the deduction of a small percentage claims might be received almost as soon as they arose.

A POLICYHOLDER held that the money should be paid as soon after the death as possible, without any deductions, and believed their not doing so kept away many insurers.

The CHAIRMAN, in reply to questions from Mr. Turner, stated the sum divisible as bonus was 20,000*l.* less than at the previous quinquennial division, consequently there was that amount of decrease in the profits of the five years. As to the period at which the claims were payable after the death of the policyholder, it was an element in the calculation of the rate of premium, and if they were paid immediately without deduction they must either alter the rate of premium or diminish the reserve, otherwise there would be a considerable reduction in the profits. When immediate payment was desired 5 per cent. discount was charged, which, considering that the premium rate was less than that charged by other offices, was not heavy. Permission to go abroad for purposes of health might be obtained on the production of a medical certificate. The directors did not think it would be wise to alter the conditions on which policies were issued. The annual report could always be had a week before the meeting, but the quinquennial report could not be got ready in time for circulation prior to the meeting. The extra claims of the past five years had arisen from a rate of mortality which they had no right to expect, and by an unfortunate coincidence it had fallen chiefly upon the large policyholders. As the policyholders grew older the reversionary bonus necessarily became less, but the cash payment in lieu of the reversion was more. The calculations of the society were so well based that if they were to wind-up to-morrow the safety of the office would be in no way impaired, and they would be able to pay all claims. (Cheers.) He then moved the adoption of the report.

The Right Hon. E. P. BOUVERIE, M.P., seconded the proposition, which was put and carried unanimously.

The bonus and contingent bonus were declared.

Unanimous votes of thanks were passed to the Chairman and directors, to Mr. Downes (the actuary), to Mr. Grimes (the secretary), and to the other officers of the institution. The proceedings then terminated.

LONDON BANK OF MEXICO AND SOUTH AMERICA.

The ordinary general meeting of shareholders was held on March 20, at the City Terminus Hotel,—Mr. F. W. RUSSELL, M.P., in the chair.

The report states that, after paying charges, deducting rebate, making provision for bad and doubtful debts, and applying the sum of 3462*l.* 7*s.* 8*d.* in the reduction of the par of exchange at Lima, there remains an available balance of 25,049*l.* 3*s.* 11*d.* (including 4054*l.* 1*s.* 8*d.* brought forward from last half-year), which the directors recommend should be appropriated as follows:—Dividend for half-year, at the rate of 8 per cent. per annum, 16*s.* per share, free of income tax, 14,409*l.* 12*s.*; reserve fund, 8000*l.*; leaving a balance of 2639*l.* 11*s.* 11*d.* to be carried forward to the next half-year, subject to reduction by the payment of income tax and auditors' fees. The directors report that Mr. J. Macgregor Mackay, director of the Australian Joint-Stock Bank, has joined the board. The dividend warrants will be issued payable on and after the 22th inst.

The CHAIRMAN expressed the pleasure the directors felt at meeting the shareholders under the very favourably altered circumstances of the company. They had hitherto been almost in a state of trial. Now they were beginning to test it, and the results of the test showed the ability of the two countries with which chiefly they transacted business of affording a good, satisfactory, and, he hoped, a permanent source of profit. Many of the reports which had appeared in the papers of the unsatisfactory state of Mexico were attributable to interested motives, and were put forward by speculators with a view to profit by them. Considering the great political changes that had occurred in Mexico—the French intervention, the creation of an empire and its melancholy end, it was gratifying to find that under a native Government that country was holding her place, and to a certain extent re-establishing order, and developing her resources, and with the increased facilities which the completion of the railway system would afford that development would no doubt progress more rapidly. The resources of Peru also were developing, and although we heard many contradictory reports as to the failure of the guano, accounts which he believed were reliable stated that the supply was equal to 10 or 12 years of the increased demand occasioned by the extended use of it in the South American

States. Another favourable circumstance for the future of the bank was the expectation that free trade in the valuable metals would be established in Mexico by the abrogation of the impost on bar silver. The best proof of the confidence by the bank had acquired was the increase in the note circulation (34,000*l.* in the past year) in both countries. After testifying to the ability of the managers, he concluded by moving the adoption of the report.—Mr. CHAYTOR, the Deputy Chairman, in seconding it remarked that the present were the most favourable accounts the board had presented.

Mr. MARSHALL, one of the auditors, added a few words on the greatly improved condition of the bank.—A vote of thanks to the Chairman, directors, manager, and officers concluded the business.

GREAT WHEAL VOR UNITED MINING COMPANY.

The quarterly general meeting of shareholders was held at the offices, Gresham House, on Wednesday,

Mr. GEORGE NOAKES, F.G.S., managing director, in the chair.

Mr. TRURAN (the secretary) read the notice convening the meeting, and the minutes of the last were approved.

The report of the committee of management was read, as follows:—

The committee have the pleasure to state that the prospects of the mine are more encouraging than they were at the last general meeting. The lode at the 204, east of Metal, still holds on productive. The western ground in several points gives promise of a rich run of ore. The bottom of Ivey's shaft is again productive. The 162 and the 204, west of Ivey's, show every indication of coming into the profitable run of ground which was so productive in the 157 above them. The lode has also been cut productive at the 157, under Edwards's shaft, where a rise is about to be put up to hole the shaft now sinking below the 125; this, when accomplished, will give good ventilation, and enable the levels to be carried further west in this most important ground. The committee, therefore, have every reason to hope that during the next quarter considerable improvements may take place. It is, however, a matter of deep regret to the committee to have to state that several accidents have occurred to the pitwork and underground machinery during the last two months, which have much retarded the development of the mine, otherwise the present report would, in all probability, have been the most favourable for some time past. Two of the main rods at Ivey's shaft broke within a week of each other; there was, also, a serious breakage of the balance-bob at the 60, and while the engine stopped for the repairs the wacer rose to the back of the 180. An accident occurred, also, to Old Wheal Metal whim, which caused the water to rise at Edwards's shaft. These disasters were met by the most prompt and energetic efforts of the agents, and are now happily overcome, and the water nearly in fork throughout the bottom of the mine. It is a satisfaction to the committee that notwithstanding these impediments the returns have been maintained, but the repairs and delay consequent upon these unforseen accidents have greatly increased cost, and lessened the advantage which the shareholders would otherwise have derived from the great rise in the price of tin. Still the committee, looking at the circumstances which of late have surrounded the prospects of the mine, and the difficulties that have supervened, feel that there is great cause for congratulation in the continued maintainance of dividends, and the preservation of a sound financial position; and should the present prospect of improvement in the mine be moderately realised, and the price of tin be maintained, of which there appears no doubt, the committee fully hope to present more profitable results to the shareholders at the next general meeting.

The report of the agents was read, as follows:—

March 23.—The 216 is driven east of Metal shaft 5 fms., and is now within about 3 fms. of the winze sunk below the 204, on south lode. The 204 is driven east of Metal shaft, on south lode, 14 fms.; the lode in the present end is 2 ft. wide, worth 40*l.* per fathom, with every appearance of a continuation. A winze sinking below this level, about 5 fms. behind the end, is down 8 fms. on a lode 18 in. wide, worth from 15*l.* to 20*l.* per fathom. The 216, driving west from sump-winze, on the north lode, is extended 8 ft. on the lode, which is 9 inches wide, producing a little tin. We expect shortly to meet the shoot of tin gone down in the level above.—Ivey's: Ivey's shaft is sunk about 15 ft. below the 204 fm. level; the lode at the shaft is 1 ft. wide, containing occasional stones of tin. The 204 is driven west of Ivey's shaft 8 fms., on a tinny lode for the whole distance, and is now worth fully 15*l.* per fathom. The 194 is extended west of Ivey's shaft 20 fms.; the lode in the present end is 2 ft. wide, worth 10*l.* per fm. The 162 is driven 78 fms. west of Ivey's shaft, and is within 26 fms. of being under Edwards's shaft; the lode is 3 ft. wide, presenting a very promising appearance, and is worth 10*l.* per fm. By driving north west of the 157, to get under Edwards's shaft, we intersected a large branch, which as we drive on is developing itself into a fine masterly lode, now 2 ft. wide, already worth 15*l.* per fm., and which will, no doubt, eventually prove to be the main lode, having been heaved by the small cross-course passed through about 15 fms. behind the end. A winze sinking below this level, on the south part of the lode, 10 fms. from the end, is down 2 fms., on a lode about 2 ft. wide, worth 20*l.* per fathom. Edwards's shaft is sunk about 3 fms. below the 125 fathom level; the ground is favourable for sinking, and we are making good progress. The 125 fm. level cross-cut, driving south towards the lode, is extended 4 fms., and we are daily expecting to inersect it. The 114 is driven west of Edwards's shaft 16 fms., on a lode 3 ft. wide, well defined, and letting out a quantity of water, but of very little value. In our tribute department we have more than 50 pitches working in the 174 and above, at an average tribute of 6*s.* in 1*l.* at the standard. We are giving the tributers 50*l.* per ton, but at our selling price 74*l.* per ton; the tribute is at an average of 4*s.* in 1*l.* We have a considerable quantity of low quality tin ground opened up, which, at the present high price of tin, will pay very well on tribute. Although we have been rather unfortunate during the past month in expediting our explorations, in consequence of some little accidents to our pitwork, our returns have been maintained, and we are glad to say that we are now again in fork, and all our operations are progressing most satisfactorily.—S. HARRIS, G. M. HENTY, JOHN JAMES.

The CHAIRMAN said he rejoiced that upon the present occasion he was able to give a much more cheering report than was submitted when he last addressed the shareholders. He pointed out at the last meeting the real position of the mine, but, at the same time, he gave it as his conviction that there would be improvement during the ensuing three months. Probably, the shareholders were aware that there was ever a great anxiety to those who conducted the administration of any mining enterprise, as the alternations were so great and frequent—there was hope and fear, poverty and riches, abundance and exhaustion; but, on the other hand, there was that buoyancy of hope and indomitable perseverance that bore up the miner against every adverse change. He had always said that mining was a legitimate enterprise, and although he might sometimes describe the mine as being in a less satisfactory position than at other times, yet he had continually pointed out the grounds upon which he had looked for an improvement. They had had their successes, their vicissitudes; and, probably, their greatest vicissitude had been that their greatest success was at the time when the price of tin was exceptionally low. He had always, however, endeavoured to manage its affairs and its resources so as to impart to the mine a character of permanence, and it was by means of that policy that they had been enabled, throughout such times of depression as had been passed through, to maintain a satisfactory rate of dividend. He hoped that policy had been appreciated by the shareholders, and that so long as they reposed confidence in the executive they would approve its continuance. (Hear.) Among the several important points to which he referred at the last meeting two were realising his expectations; for instance, in the 204, at Metal shaft, there was a lode going away east, while there were very good prospects at the 216 that the same lode would be cut equally productive. The lode west of Ivey's shaft had also very much improved, and the different ends had undergone a most favourable change since the last meeting. This was particularly the case as regards Edwards's shaft, where they had heard from meeting to meeting the grounds upon which they hoped eventually to meet with a good course of tin. Some time since the surveyor directed a cross-cut to be put out south, for the purpose of getting under that shaft, and within the last few days a small branch of ore had been cut, which, upon being opened upon, proved to be a part of the main lode, 4 ft. wide; therefore, the fair inference was that upon further development it would be a very productive lode. Irrespective of those points, the price of tin had enabled them to work in many parts of the mine that hitherto would not have paid; fortunately, those points now came in and saved their stopes, the best of which he told them at the last meeting had been worked away, those left being of a much lower quality. As he had already said, he hoped the shareholders would support the executive in carrying on the mine with a conservative policy, and thus enable them to develope its resources to the best possible advantage. He made this remark to prevent shareholders thinking that because the mine had improved they would immediately realise the advantage, for it would take three months to develope those points and make them available; at the same time, they were enabled to maintained their returns, and preserve a sound financial position. (Hear, hear.)

Mr. PETER WATSON said that he visited the mine last week, and he was pleased to endorse the congratulations of their Chairman as to its improved position and prospects; and, added to that, there was the greatly improved price of tin, which, in face of a general opinion to the contrary, he had long since predicted would take place, and from facts within his knowledge he fully believed there would yet be another considerable advance as soon as the April sale of Banca tin had taken place. He hoped, however, the advance would not be too rapid or too great, inasmuch as the risk of a reaction would then be incurred. He had been pleased to observe during his recent visit to Cornwall the marked favourable change which the improved price of tin had brought about in the mining districts, although it was but justice to mining to say that the dire distress paraded before the public, through the columns of the *Times* and some of the Cornish papers, had never existed to the extent indicated, while a large proportion of that which really did exist had nothing whatever to do with mining, but to the absence of employment on the part of the fishery companies. To revert, however, to the price of tin, their Chairman would bear him out when he stated that two years since he urged the stocking of the Great Vor returns in order to await the better price. It was true that Mr. Noakes did not adopt his view of the subject, but he (Mr. Watson) reiterated his opinion that had Mr. Michael Williams been living tin would never have declined to the price it had during the last two years. But they had a good price now, and he hoped and believed it would not only continue, but still further improve. As far as Great Vor was concerned, he had as favourable an opinion of it as he ever had, and the present prospects in connection with Edwards's shaft—where they must have expended nearly 20,000*l.*—materially confirmed his sanguine anticipations as to that important portion of the company's property. As he had stated upon previous occasions, the lode there was between the same cross-courses as that which had produced tin to the value of something like 1,000,000*l.* He believed that would eventually prove the best part of Wheal Vor.

Mr. W. H. LANYON (late of the Kennall Gunpowder Company) said that last Saturday on his return from the Great Western Mines he visited Great Vor. He found that the manager was very sanguine as to the future, stating that the water would be in fork by this morning.

The CHAIRMAN said they expected to be in fork by Thursday.

Mr. LANYON said that he found the lode in the 152 was producing good stones of tin, and the stone which he held in his hand came from the 157, west of Ivey's, exactly under Edwards's shaft.

The CHAIRMAN said, before proceeding to read the financial statement, he wished to urge the shareholders to support the committee in the prudent recommendation they were about to make with respect to the amount of dividend. None could tell how these improvements would open out, although they had always believed they had a good channel of ground to pass through, and that they were approaching a second good mine. But, in the meantime, let them keep in such a financial position as to enable them to meet any contingency that might arise. He thought it would be unadvisable to divide too much of their balance at the present juncture, but rather let them look forward to the results of the ensuing three months, at the expiration of which he hoped to be able to dispense the balance with a more liberal hand. He then read the following statement of accounts:—

The audited cash account to Jan. 30 last showed a balance of.....		£2373	17 8
Since which date there has been received—			
Tin sale in February	3459	19	8
ditto March	3710	4	9
Sundries sold, &c., at the mines	5	19	3
Total		£9550	1 4
And paid—Cost for January £2450 10 11			
Sundries, postage, &c. ..... 3 3 9 =		£2453	14 8
Balance, cash and bills		£7096	6 8
The actual account stands this day as follows—			
Balance as above		£7096	6 8
From which deduct—Cost for February..... £2387 12 2			
Sundries, salaries, &c. ..... 192 5 0 =		2579	17 2
Balance in favour of the mines		£4516	9 6

The CHAIRMAN said that out of this balance the committee recommended no more than a dividend of 5*s.* per share, which was the same amount as was paid at the preceding meeting. It would be remembered that for the last six months they had been infringing upon their surplus balance, but it was now to replace the amount thus absorbed, and bring up the surplus balance to its normal amount. As to the price of tin, he believed, with Mr. Watson, that there was no reason to apprehend any decline, at least during the present year—at any rate, that was the opinion of all authorities upon the subject. So that at the next meeting the committee hoped to be in a position to recommend a larger dividend, and at the same time maintain the normal surplus balance.

Mr. MARSDEN enquired the amount of the difference in the price of tin from the time the advance commenced?—The CHAIRMAN said that from 1867 the lowest price realised had been 54*l.*, and it was now 76*l.*—that is, the advance on the ore; but prior to January, 1867, a lower price was realised.

The O'REILLY asked what would be the actual balance carried forward?—The CHAIRMAN said that after the payment of a 5*s.* dividend the surplus balance would be 3039*l.* 9*s.* 6*d.*

A SHAREHOLDER said that the proposition of a dividend of 5*s.* per share would, no doubt, be unanimously accepted by the proprietors, and at the same time tender to the committee their warmest thanks for the sound, commercial manner in which they continued to conduct the affairs of the mine.

Mr. WARBURTON said that unless the committee had some doubt as to a recurrence of accidents they were acting with more than prudence by retaining such a large reserve balance, in face of such manifest improvements in the mine and in the value of its produce. He thought they might prudently declare a dividend of 7*s.* 6*d.* per share.—The CHAIRMAN said that it was true a dividend of 7*s.* 6*d.* per share had been earned, but if it were divided the surplus balance would still be kept below its normal amount.

The reports were received and entered on the minutes, and the accounts were passed and allowed. Mr. Noakes, F.G.S., was reappointed Chairman and managing director, and the committee were re-elected. A dividend of 5*s.* per share was declared.

The CHAIRMAN, in acknowledging a special vote of thanks for his continued attention to the company's interests, returned the shareholders his most sincere thanks for this renewed mark of their confidence. His colleagues and himself endeavoured honestly to conduct the affairs of the company to the best possible advantage. They felt they did so conscientiously, but no one could command success. They had had many trials and a great deal of success, and they now thought they saw before them brighter times; therefore, they could only hope they might be spared many years to meet each other under more auspicious circumstances. (Hear, hear.)

Mr. William Moates, public accountant, was reappointed auditor. A unanimous vote of thanks to the Chairman terminated the proceedings.

CHIVERTON MINING COMPANY.

An adjourned general meeting of shareholders was held at the London Tavern, Bishopsgate, on Wednesday,

Mr. PETER WATSON in the chair.

The CHAIRMAN explained that the meeting was adjourned from Nov. 26, when a committee was appointed to endeavour to carry out an arrangement which Mr. Peter (the lessor) had, in fact, agreed to prior to the meeting, whereby the Chiverton Company was to have an additional 80 fms. on the course of the lode, giving up a corresponding quantity in another part of the sett. Since the committee had been appointed they had done their utmost in the interest of the company, but regret to state without favourable results. The committee on behalf of the Chiverton Company were willing to undertake the risk of any legal proceedings which might be taken against them by the Mineral Bottom adventurers, but declined to indemnify Mr. Peter for actions brought against him. He (the Chairman) read to the meeting the correspondence which had passed between the several parties, and remarked that the meeting would see they had been rather unfairly treated. As, however, the question was a complicated one, it had been suggested by their counsel that it would be better for them to attempt a settlement than to go to law, yet he (the Chairman) believed that if they had gone into the Court of Chancery they would have got a verdict. He regretted to say that they were, as far as the negociations were concerned, in the same position as at the last meeting. He had requested Mr. Clogg to remit the 400*l.* necessary to fulfil the terms of the agreement had it been entered into, and that amount was now lying untouched at their bankers in the county. Under these circumstances, they might consider the business of the adjourned meeting to be concluded.

Mr. CLOGG then read the notice convening the general meeting, Mr. Peter Watson being again voted to the chair.

The CHAIRMAN said that the chief business before them was to consider and, if approved, authorise an amalgamation with the Mineral Bottom. He might observe that the meeting should have been held a month ago, but there had been some delay in consequence of the pending negociations.

The subjoined report and the statement of accounts, showing a credit balance of 15*l.* 16*s.* 4*d.*, were then read:—

March 23.—Since the last meeting we have sunk the new shaft to the 30 fm. level, cut plat in the 20 fm. level, also a plat in the 30 fm. level. The shaft has been sunk in a large and promising lode, which has produced some lead work, the present bottom producing stones of lead. The 20 fm. level has been driven south 36 fms., in a lode which has been from 18 in. to 2 ft. wide, composed of quartz, mundic, and stones of lead. In the 20 fm. level north, about 9 fathoms from the shaft, we have sunk a winze and communicated to the 30 fm. level; the first 3 fms. sinking was worth on an average 45*l.* per fathom, and the remainder through tribute ground. The winze sinking below the 20 fm. level, south of the shaft, is down 10 fms.; the first 2 fms. sunk was worth 1 ton of ore per fathom, and the remainder producing saving work; in the present bottom the lode is producing stones of lead. In the 30 fm. level, driving north of shaft, the lode is 2 ft. wide, composed of spar and flookan, with stones of lead. In the 30 fm. level, south of shaft, the lode is 18 in. wide, composed of spar, with a kindly appearance. There are two stopes in the back of the 20 fm. level, one north and the other south of the shaft, each worth 1 ton of lead per fathom. Since the last meeting we have sold 76*3l.* 16*s.* 6*d.* worth of lead, and have on the floors dressed and ready for sale about 300*l.* worth more. In commencing to work below the 30 we have cut water; it rose from Saturday to Monday 2 feet in the level, and took our horses 30 hours to fork it; we are, therefore, completely stopped in sinking and working our bottom level. To meet this water, and enable us to sink and resume operations in the bottom level, we recommend the removal of the whim-engine from the old mine. The removal and repairs will cost about 400*l.*, but it will enable us to stop the working of our large pumping engine, and enable us to draw the stuff with it at once. It will also be suitable for permanent winding, and, by attaching the crusher to it, enable us to crush when not winding. It will be of sufficient power to keep the water for a considerable depth, and, no doubt, prove the permanent value of the lode here. —JAMES JULEFF, JOHN BORLASE.

The CHAIRMAN explained that the accounts had been charged close up. If they had not included the January cost, and had made it a three months' account, as usual, they would have shown a credit balance of about 300*l.*

Mr. HAMILTON enquired the average monthly cost, and the value of the lead they had got against it?—Mr. CLOGG said that the monthly cost was about 250*l.* With regard to the ore, he was at the mine on the previous Saturday, and went over it with the agents. They had about 20 tons of ore ready for sale, and there was a considerable quantity which would be at once prepared for sale.

The CHAIRMAN thought Mr. Hamilton's question would be best answered by stating that, the January cost and bills being included in the accounts, they had a credit balance of 15*l.* 16*s.* 4*d.* Their cost was 250*l.* per month—that was, 500*l.* would be due to the end of March. Against this, they had 20 tons of ore broken and dressed, and upwards of 10 tons in course of dressing, which, taken in round numbers at 15*l.* per ton, would give them from 450*l.* to 500*l.*; consequently, if the February and March costs were brought in, they would still be in the position of having a clear book. He concluded by moving that the report and accounts be received and adopted.

Mr. KEMP enquired whether there was any intention to make a call?—The CHAIRMAN said that there was not.

A SHAREHOLDER enquired whether there were any arrears of calls?

The CHAIRMAN said the list of defaulters was on the table, and that the amount of arrears was 275*l.* 8*s.*; he understood from the purser, however, that 30*l.* or 40*l.* had been paid yesterday, since the list was made out, so that the total would be to that extent reduced.

Mr. HAMILTON could sympathise with persons who were unable to pay calls, and their shares were unsaleable in the market; but when shares were readily saleable at a fair price, he thought that the least a shareholder could do was to sell a portion of his shares to pay the calls.

Mr. BUCHAN did not see why their money should be used by individual shareholders to the disadvantage of the general body, and would, therefore, propose that the shares of those in arear should be at once forfeited.—Mr. COOKE seconded the proposition.

Mr. CLOGG said that their rules did not provide for forfeiture, except through the Stannaries Court. He would direct attention to the fact that a large proportion of the arrears were due from two or three shareholders. The proper mode of dealing with the matter would be for the meeting to pass a resolution, instructing him to file a purser's petition, when the shares would be sold by the Court without further trouble; but as the holders of those shares were well able to pay, he did not think they would permit it to go to that. He had written to every defaulter ten days since, and had repeatedly written previously.

The report and accounts were then unanimously adopted; and it was resolved, likewise unanimously, that the purser be instructed to take the necessary steps in the Stannaries Court to procure the forfeiture and sale of the shares of all the defaulters.

Mr. CLOGG would presume that he might give notice to those concerned that the resolution had been passed, so as to afford them the opportunity of avoiding the expense of the Stannaries process.

A special general meeting of adventurers was then held,

Mr. PETER WATSON in the chair.

The CHAIRMAN, after the notice convening the meeting had been read, said that about a fortnight ago certain shareholders called upon him, and from conversation which took place there appeared a possibility of some arrangement satisfactory to both parties being arrived at by which the Chiverton Company and the Mineral Bottom Company would be relieved from all litigation for the future. The Mineral Bottom adventurers held a meeting at about the time mentioned, at which Mr. Hamilton and Mr. Lynch, *not* in their capacity as shareholders in Chiverton, but as Mineral Bottom shareholders, were present; and the subject of an amalgamation was referred to. On the Monday following certain overtures were made calculated to lead to a settlement. Although he was loth to give up any of his rights, he would not as an individual shareholder—and he represented a third of the mine, he himself being the largest shareholder—stand in the way if amalgamation were considered desirable. Personally he was equally willing to agree to the amalgamation or to go on with the legal proceedings; yet, feeling that they might obtain more by working the mine amicably than the difference which the success in law might give them, the question was whether it would not be to their mutual advantage to forget past differences, so that they might combine to develope the mine. But for the discovery made by the Chiverton Company the Mineral Bottom Company would never have claimed the ground in dispute, The Mineral Bottom Company had no machinery on the mine, whilst the Chiverton Company had machinery worth from 1600*l.* to 1800*l.* On the other hand, the Mineral Bottom had 1600*l.* cash in hand, which would represent the machinery. It was, therefore, estimated that the position of the two adventures was about equal, and they knew that the market value of the shares was also about equal in each company. Considering these facts, it was proposed to throw the two together on equal terms, putting the amalgamated concern into 6000 shares, the amalgamated concern taking over all assets and liabilities of both companies.

Mr. HAMILTON thought that after the explanation which the Chairman had given them, they could thoroughly understand the position of both companies. He (Mr. Hamilton) had thoroughly studied the matter, and had friends in both mines. There was no doubt that Mr. Peter had committed himself to both parties, and, therefore, laid the foundation of lawsuits both between the lessees holding under him and between the lessees and himself, the end of which it was impossible to foresee. The question was—Could they get out of these difficulties, and by amalgamating render further litigation impossible? He thought they could. If the shares in the mines were worth 4*l.* per share, with a Chancery suit hanging over each, how much more would they be worth if the law proceedings were got rid of. He proposed that four Chiverton adventurers should be appointed a committee to confer with the Mineral Bottom committee (which had been appointed with full powers, and were then in another room prepared to meet them, should they be appointed), and arrange the terms on which the amalgamation could be carried into effect.

Mr. BUCHAN quite agreed with Mr. Hamilton, and in seconding his resolution would name Mr. Johns, who represented influential shareholders at Southampton, as one of the committee.

Mr. EDWARD COOKE said that, having a personal knowledge of both mines, and holding about an equal interest in each, he felt confident that it would be advantageous to all concerned if an amalgamation were decided upon; under this conviction he had endeavoured, and not without success, to bring about an interview between the parties who were qualified to promote that desirable object. If the amalgamation be completed, no doubt it would considerably enhance the value of this fine property.

A SHAREHOLDER remarked that he understood that in accepting the amalgamation on equal terms the difference of the value to the extent of a few hundred pounds was not so much a matter of consideration in the minds of most shareholders as to get rid of the litigation. Both parties, no doubt, thought that they should have had a more favourable arrangement, and he certainly thought that the Chiverton should have had, but the amount of difference would be exceeded by the law costs of only a few weeks. He thought, therefore, that the question as to which had the best of the arrangement should not be raised by either party.

The CHAIRMAN observed that one good effect of the amalgamation would be that the 1600*l.* cash in hand being available in the amalgamated concern there would probably be no necessity for any further calls being made.

Messrs. Johns, Hamilton, Burnett, and P. Watson were ultimately appointed the committee to confer with the Mineral Bottom committee, and the result was an agreement "That the two setts of Mineral Bottom and Chiverton Mine be amalgamated. That such joint setts be divided into two, at a line drawn on a plan now produced, and now agreed on by the committee of the two mining companies. That the shareholders in each mine have an equal number of shares in each new sett as they now hold in either mine. That with respect to the sett at the south of the line as agreed on, that the cost of the Mineral Bottom and Chiverton Companies be brought up and discharged to the end of March by each company, and that the assets of each company be then considered to be the property of the amalgamated companies holding the sett south of such line, and to be called Chiverton United. That the number of shares in each new mine be 6000." The meeting then separated.

THE JAVALI COMPANY.

The first annual general meeting of shareholders took place at 4, Westminster-chambers, S.W., on Wednesday, and was very well and influentially attended.

The notice convening the meeting having been read by the Secretary, the CHAIRMAN (Mr. A. A. Pollock), in an able speech, laid the present state of the company before the shareholders. He read the full report of Mr. Johns on the mine, and the last letter of Dr. Seemann, showing the exact present condition of all the workings, and wound-up by moving the adoption of the report and balance-sheet, after an able peroration showing the value of the property.—Mr. JULIUS ALINGTON briefly seconded the adoption of the report.

A few questions having been asked by Mr. Allen, Lord George Paget, Mr. Hardie, Mr. Pennington, and Mr. R. Frewer, the motion was put and carried unanimously.

Mr. HARDING proposed, and Lord GEORGE PAGET seconded, the following resolution:—"That Mr. Alfred Atkinson Pollock be and is hereby re-elected a director of the company," which was carried unanimously.

Mr. POLLOCK proposed, and Mr. W. H. BAGLEY seconded, the following resolution:—"That Mr. John Russel Frewer be hereby re-elected an auditor of the company for the present financial year, and that the annual remuneration of the auditor be 10*l.* 10*s.*," which was carried unanimously.

A vote of thanks having been passed to the Chairman the meeting terminated.

[A very beautiful specimen of ore from one of the rich veins in the Nispero workings was exhibited under a binocular microscope, kindly lent for the occasion by the Messrs. Baker, opticians, of High Holborn, and gave great delight to the meeting.]

FOREIGN MINING AND METALLURGY.

French statistics are very sluggish and dilatory; still, we may take them for what they are worth. An official table has just appeared, showing the production and consumption of coal in France during the twelve years ending 1864, inclusive. The figures are as follow:—

Year.	Extraction.	Consumpt.	Year.	Extraction.	Consumpt.
1853....Tons	5,938,000	9,422,000	1859....Tons	7,483,000	13,263,000
1854	6,827,000	10,857,000	1860	8,304,000	14,270,000
1855	7,453,000	12,294,000	1861	9,423,000	15,403,000
1856	7,926,000	12,896,000	1862	10,290,000	16,275,000
1857	7,902,000	13,149,000	1863	10,710,000	16,513,000
1858	7,333,000	12,893,000	1864	11,243,000	17,491,000

The progress of coal mining and consumption in France will be still more strongly illustrated if we take a decennial view of matters from 1814 to 1864, inclusive:—

Year.	Extraction.	Consumpt.	Year.	Extraction.	Consumpt.
1814....Tons	788,000	933,000	1844....Tons	3,783,000	5,486,000
1824	1,326,000	1,782,000	1854	6,827,000	10,856,000
1834	2,489,000	3,214,000	1864	11,243,000	17,491,000

It is estimated that in 1868 the coal production of France somewhat exceeded 12,000,000 tons, and as the imports were nearly 7,000,000 tons it follows that about 19,000,000 tons of coal were consumed in the French empire in 1868. Here are precise details (from an official source) as to the imports of coal and coke into France last year:—

	Coal.	Coke.
England .....Tons	1,885,000	3,800
Belgium.....	3,718,000	448,200
Germany	1,389,000	212,700
Other countries	1,100	300
Total	6,993,100	665,000

The imports of coal into France in 1858, 1848, and 1838 were as annexed:—

Source of imports.	1858.	1848.	1838.
England.....Tons	1,314,000	515,000	305,000
Belgium	3,226,000	1,399,000	796,000
Germany.....	1,129,000	227,000	125,000
Other countries.....	3,400	2,380	750

These statistics testify to the growing industrial activity of France.

No material change has occurred in the state of the Belgian coal trade; depression continues to prevail in all the basins. The winter has not been a very rigorous one in Belgium as a whole, and the coal workers have remained encumbered with stocks. The weather has been colder of late, and a certain reduction has taken place in old stocks, but this circumstance has exerted no influence on prices, as no merchant thinks of entering into fresh arrangements at present. The only difference, indeed, which can be indicated in the general state of the markets is a rather more marked feebleness in the tone of prices. In the Charleroi district, such collieries as yield industrial coal have a very active extraction; this is, of course, explained by the requirements of metallurgical industry, which is very well provided with orders. The extraction of coal for domestic purposes is as limited in the Charroi district as it is elsewhere. In the Liége basin coke is in very active demand; it remains quoted as last week, but is held more firmly; as regards coal, the state of affairs is similar to that which exists in other basins—that is, the demand is active for industrial requirements, and very limited as regards domestic qualities. The coal owners of the Couchant de Mons have reduced their extraction more than their neighbours. Some of the Couchant de Mons coal workers are profiting from the present time of check, which secures them labour at a cheap rate, to carry out various preparatory works. The Festiaux de Couillet Colliery has just been sold to M. Félix Evette, jun., for 14,400*l.*

The state of the French iron trade remains much the same. The late rise in prices has occasioned some difficulties in the Moselle group, and has resulted in the withdrawal of certain orders for iron, but producers have been very slightly alarmed at this, and the late advance in prices has been maintained with great firmness. Charcoal-made pig for refining has made 4*l.* per ton at St. Dizier; mixed ditto (half coke), 3*l.* 8*s.* 10*d.* per ton; coke-made ditto (Meurthe and Moselle), 2*l.* 17*s.* 6*d.*; casting pig, No. 1 (good marks), 4*l.* 16*s.* per ton. First-class merchants' iron from charcoal-made pig, in warehouse at the works, has brought 8*l.* 16*s.* to 9*l.* per ton; mixed ditto,

8*l.* 8s. to 8*l.* 12s. per ton; ditto from coke-made pig, 7*l.* 12s. per ton. Refined rolled iron from charcoal-made pig has realised 12*l.* 16s. to 13*l.* 4s. per ton; ordinary grained iron, 11*l.* 12s. to 11*l.* 14s. 6d. per ton; and fine-grained iron, 13*l.* to 13*l.* 4s. per ton, with a scale of 8s. per ton per class. First-class coke-made sheets have brought 8*l.* 16s. to 9*l.* per ton; ditto puddled charcoal-made, 9*l.* 8s. to 9*l.* 12s. per ton, with a scale of 8s. per ton per class. As regards machine iron, it may be noted that No. 21, and upwards, coke-made has brought 8*l.* 4s. per ton; charcoal made ditto, 9*l.* 4s. to 9*l.* 8s. per ton; ditto No. 20, charcoal-made, 9*l.* 16s. to 10*l.* per ton; ditto No. 20, mixed, 8*l.* 16s. to 9*l.* per ton; ditto No. 20, coke-made, 8*l.* 8s. to 8*l.* 12s. per ton; ditto, fine-grained iron, 12*l.* 16s. to 13*l.* 4s. per ton; ditto refined charcoal-made first-class, 13*l.* 12s. to 14*l.* per ton; ditto second quality, 12*l.* 16s. to 13*l.* per ton, &c. A contract has been let for castings required in connection with the water supply of Toulouse. The Terre-Noire Foundries and Forges Company obtained the contract for 28,340*l.* Meetings are announced as follows:—Montebras Tin Mines Company, March 25, at Paris; Montrambert and La Berandière Collieries Company, March 30, at Lyons; Rive-de-Gier Collieries Company, March 30, at Lyons; St. Etienne Collieries Company, March 30, at Lyons; Bouches-du-Rhone Collieries Company, March 30, at Paris; Commentry Collieries and Fourchambault, Montlucon, &c., Forges and Foundries Company, March 30, at Paris; Carmaux Mines Company, March 30, at Paris; Haute-Loire Coal Mines Company, March 31, at Paris; Chazotte Collieries Company, March 31, at Paris; Mokta-el-Hadid Magnetic Iron Minerals Company, March 31, at Paris; Bessèges Colliery Company, April 3, at Nimes, &c.

The owners of the principal Belgian ironworks have decided on making a fresh advance in prices, and rolled descriptions are now quoted at 6*l.* 8s., 7*l.*, 7*l.* 12s., and 8*l.* 8s. per ton for Nos. 1, 2, 3, and 4. As regards plates, it is stated that all the works have introduced a classification adopted by the Charlerol Committee of Forgemasters. With reference to the Committee of Forgemasters, it may be noted that it assembled recently to elect a President in succession to M. Spitaels, deceased. The choice fell on M. Smits, director of the Couillet and Châtelineau Companies; but it appears that M. Smits is scarcely disposed to accept the honours thus thrust upon him. It appears that the production of the collieries worked by the Couillet Company in 1867-8 was 1,970,112 hectolitres, and that of the collieries worked by the Châtelineau Company 2,726,381 hectolitres, making a total of 4,696,493 hectolitres. The mineral bearings worked by the Couillet Company in 1867-8 produced 279,159 hectolitres, and those worked by the Châtelineau Company yielded 89,254 hectolitres, making a total of 368,413 hectolitres. The blast-furnaces of the Couillet Company in 1867-8 yielded 38,909 tons, and those of the Châtelineau Company 22,044 tons, making a total of 60,953 tons. The rolling-mills of the Couillet Company in 1867-8 yielded 22,598 tons, and those of the Châtelineau Company 17,438 tons. The Couillet construction workshops in 1867-8 produced 2704 tons, and those of the Châtelineau Company 2199 tons, making a total of 4903 tons. The number of workmen employed by the two companies in their various operations was 6400, and the aggregate amount of the transactions effected in 1687-8 was 602,253*l.* Meetings are announced as follows:—Sacré Madame Colliery Company, March 29, at Antwerp; Levant d'Elouges Colliery Company, March 29, at Mons; United Proprietors Colliery Company at Marchienne-au-Pont, March 30, at Marchienne-au-Pont; Peronnes Colliery Company, March 30, at Brussels; Cappelle-sur-Yssel Rolling Mills Company, March 31, at Cappelle-sur Yssel; Vallée du Piéton United Collieries Company, March 31, at Roux; Parades d'Avroy and Boverie Colliery Company, April 1, at Liége, &c.

Feebleness is the predominating feature in the French copper markets. At Havre, Chilian in bars has declined to 72*l.* per ton, Paris conditions; the last quotation was 72*l.* 8s. per ton, Paris conditions; some transactions have also taken place for the end of the current month at 72*l.* 4s. per ton, Paris conditions. At Paris prices have remained without any sensible variation; 72*l.* per ton has been obtained for Chilian in bars, 77*l.* to 78*l.* per ton for Chilian in ingots, and 76*l.* per ton for Corocoro mineral. The German copper markets have participated in the general fall. At Cologne it is true that prices have remained without much variation, but at Berlin the tendency has been more feeble. At Hamburg also the article has been in little demand, and quotations have been indifferently sustained. At Rotterdam prices remain about the same, Deontheim making 50 fl. to 52 fl., and Russian 51 fl., but without transactions worth mentioning. At Havre, Banca tin has made 114*l.* to 117*l.*; Straits, 112*l.* to 116*l.*; and Peruvian tin, 100*l.* to 104*l.* per ton. At Paris, Straits has made 121*l.* 4s., and English, 126*l.* per ton. At Stettin there has been a considerable improvement in tin. There has also been some advance on the Dutch markets. At Rotterdam, Banca tin has been dealt in at 80 fl., and Billiton at 79 fl. At Amsterdam prices range respectively from 79¼ fl. to 80 fl., and 78¼ fl. to 78¾ fl. Zinc has remained without change in price at Paris and Havre; the same may also be said of the Cologne, Breslau, and Hamburg markets. At Stettin there has been some little improvement.

FOREIGN MINES.

ST. JOHN DEL REY MINING COMPANY (Limited).—Advices received March 8, ex steamer La Plata, *via* Southampton.

Morro Velho, Jan. 29.—GENERAL OPERATIONS: During the past fortnight we have had the termination of the unusually long "veronica" (a period of fine weather in the rainy season), which commenced on Dec. 30, and lasted until the 20th current without rain, excepting a fall of 0·08 in. on the 3d. On the night of the 20th we had the renewal of the wet season, being preceded by darkening clouds and a terrific thunderstorm; the rain-fall during about six hours of that night amounted to no less than 4·20 in. Our water-courses stood well this trying test, nor did we suffer any inconvenience worth noting from this unprecedented rain fall on the establishment. The general operations of the company have been carried on with regularity, and since the resumption of the rains we have an ample water supply for driving the stamps, arrastres, and the machinery generally.

SCHNEIDER'S INCLINED PLANE EXTENSION.—This line has now been extended up, through, and over the Bahu stage, to a sufficient height to reach the level of the tramway leading to the Addison spalling-floor. To effect this a strong platform of timber became requisite, on which to construct the required landing brace, 45 ft above the Bahu stage. This structure was completed, and the hauling commenced to deliver the stone from this line, on the upper level, on Monday, the 25th current, thus conveying the whole of the stone drawn by Schneider's line to the Addison spalling-floor, where it will become available for the turbine and stone-breaker.

The quantity of stone which will now be delivered on the Addison floor will afford, I hope, sufficient to keep the stone-breaker fully employed, and thereby relieve a very considerable proportion of our spalling force. The machine will from to-day be kept working night and day, and should perform a duty equal to 50 or 60 spallers at least. This will lessen our cost for labour.

GOLD EXTRACTED TO DATE.—The produce from the stamps for the second division of January, being a period of 11 days, amounts to 3284 oits. It has been derived as follows:—

	Oitavas.		Tons of stone.	Oits. p. ton.
From General stamps	2590	from	1457·4 =	1·777
From Herring ditto, Gamba stone	694	„	429·2 =	1·617
Total	3284		1886·6	1·687

The produce of the Gaia stamps for 11 days:—

From Gaia and Gabiroba stone	489	from	315·0 =	1·552

Although the general standard yield is not quite so high as was obtained in the first division of the month, yet the produce is larger for the same period by above 200 oits., the stamps have done larger duty, and the gold return is better. There is reason to conclude this rate of produce may be maintained for the present, and that the cost of extracting it will now be somewhat lessened.

GOLD REMITTANCE.—The troop left on Jan. 27 with five boxes containing 14 bars, weighing in all 20,640 oits., equal to 198·288 lbs. troy. It is sent forward with instructions to the agents at Rio de Janeiro to ship the same by Royal Mail steamer for Southampton. I hope the next remittance may be better, as there is reason to conclude it will be so.—N.B. The gold has safely arrived in London.

Advices received March 24, per steamer Guienne, *via* Bordeaux:—

Morro Velho, Feb. 17.—GENERAL OPERATIONS: Throughout the past fortnight our general work here has been carried on steadily, and without any interruption. Moderate duty has been done both at surface and in the mines generally, and also at the sinking of the new shafts.

PRODUCE.—The produce for the month of January amounts to 10,417 oits. It has been derived as follows:—

	Oitavas.		Tons.	Oits. p. ton.
From General stamps	7063	from	3932·7 =	1·796
From Herring ditto (Gamba ore)	2031	„	1194·0 =	1·701
	9094		5126·7 =	1·773
Arrastre produce	593	„	=	0·115
Praia ditto	730	„	=	0·143
	10,417		5126·7 =	2·031

The produce of the Gaia stamps—

From Gaia and Gabiroba ore	1311	„	860 =	1·524

This is the best month's produce we have had at the Morro Velho works since June last. The standard yield of the mineral treated is better than we had last month, being, as may be seen, 2·031 oitavas per ton.

COST AND LOSS.—The produce at Morro Velho being ..... 10,417 oits.
Deduct loss in melting into bars ..... 23 oits.
10,394 oits.

Which at 7s. 9d. per oit., amounts to £4,027 13 6

Cost—Labour....Rs. 35,602 $711
Other charges Rs. 26,393 $907

Rs. 61,996 $618, at exchange 1s. 5½d. per milrei .. 4,520 11 9

Loss on the working for January ..... £ 492 18 3

FERNAM PAES ESTATE.—Gaia and Gabiroba produce 1311 oits.
Loss in melting into bars 2
1309 at 8s. 7d. = 561 15 7

Total outlay ..... Rs. 7068 $070
Less new plant 1126 $647

Rs. 5941 $423 at 1s. 5½d. per milrei .. 433 4 7

Profit on the working for January £128 11 0

NEW SHAFTS.—The outlay for January amounts to Rs. 8732 $583,
At exchange 1s. 5½d. per milrei £636 15 0

The cost at Morro Velho for the month, whether in milreis or sterling, is the lowest we have had; and as the produce is a little better than the average for some months past, we have the satisfaction of showing less loss than any month since June, 1868.

MINES.—There has been a very good attendance of natives in the mine department during January, giving the following daily averages:—

Natives boring daily	143·96
Others ditto	14·54 = 158·50
Natives working daily	263·23
Others ditto	305·61 = 568·84

Showing about six more natives in mine force employed than in the previous month.

In the GAMBA MINE the sinking has been suspended, in order to get in a new cistern and better series of pumps at the sump. This work is now well forward.

The stoping has been carried on during the month, but a larger proportion of killas than usual has been sent to the spalling-floors. There is no change to report in the lode. The cross-cut towards the Cachoeira has been extended about 4 ft. during the month.

The EAST CACHOEIRA has given a small supply of stone; the lode is small and difficult to quarry.

In the BAHU the stoping has been continued below Nos. 3 and 4 stulls, and about the usual amount of stone quarried at these places. Schneider's line now delivers the stone drawn by it in the level of the tramway leading to the Addison spalling-floor, in order that it may be available there for the stone-breaker.

The GENERAL WORK in the department has been carried on regularly, without any interruption.

GAIA MINE.—The heavy run in of the debris from the old workings has not been successfully arrested in its descent in the soft footwall, which affords no footing for either timber or other work to carry the weight above, so that we are still excluded from the best (the southern and lowest part) of the lode. This greatly diminishes the amount of produce which we ought otherwise to obtain here. The Gaia has given 514 wagons of stone, and at the Gabiroba 224 tons have been quarried and conveyed to the stamps during the month.

REDUCTION DEPARTMENT.—The duty in January may be seen from the following summary:—

Stamps heads working 31 days, average	122·06 heads.
Stamps heads working, 135 heads, average	28·03 days.
Arrastres each has worked, average	23·81 days.
Produce of each stamp head per diem	2·415 oits.
Produce of each arrastre per diem	1·556 oits.
Produce of each arrastre on that of stamps	6·49 per cent.

The quantity of sand amalgamated amounts to 2688 cubic feet, which has yielded 2·73 oits. per cubic foot.

The unrecovered gold contents are shown at 1·237 oits. per ton, or 39·47 per cent., which it rather too large. At Gaia the unrecovered gold amounts to ·833 oits. per ton, or 35·32 per cent. of the whole.

PRAIA WORKS.—The produce obtained at these works is as follows:—

Sand re-treated by stamps with killas	354 oits.
Arrastres re-treating sand only	376 oits.
Total	730 oits.

GOLD EXTRACTED TO DATE.—The produce of the stamps for the first division of February, being a period of ten days, amounts to 2946 oits. It has been derived as follows:—

	Oitavas.		Tons of stone.	Oits. p. ton.
From General stamps	2296	from	1370·9 =	1·674
From Herring ditto (Gamba)	650	„	375·2 =	1·732
Total	2946		1746·1	1·687

The produce of the Gaia stamps for ten days is as follows:—

	Oitavas.		Tons of stone.	Oits. p. ton.
From Gaia and Gabiroba ore	329	from	316 =	1·041

The produce at Morro Velho is just about the same as was extracted during the second division of January, being exactly the same standard yield per ton of mineral treated; the stamps' produce being almost 3 oits. per diem.

The Gaia produce, from the cause already stated, is not so good as heretofore.

The health of the establishment is good at present.

NEW SHAFTS.—At the present moment there is a little delay, owing to the putting in of the brattices in the upper part of both shafts. It appeared desirable Mr. Sopwith should have a portion of this work done before he left, in order that there may be no ground for doubt as to the mode intended for making these partition divisions in the shafts.

The horse-whim is now available at shaft B, and will be brought into use. That for shaft A is being erected. The preparation of the site for this whim has cost a good deal as regards labour, as it appeared desirable to place it on the opposite or east side of the Corrego, for convenience, and so avoid confusion with the signals and drivers of the other whim. They are strongly made, and will, I hope, answer well; as a temporary means for hauling, and by the application of horse-power, we shall save a certain amount of manual labour, and also be enabled to haul, and, consequently, sink more rapidly. We shall now, I believe, make more progress in sinking, if the rock continue firm and hard, as it is at present. It will be advantageous, and less expensive, if we can continue to sink without the use of close timbering.

DON PEDRO NORTH DEL REY.—Mr. F. S. Symons reports—Produce for January, 19,968 oits., at 8s. 6d. per oit., 8486*l.*; cost, 2200*l.*—profit, 6286*l.* The works have been carried on well, stopes yielded first-class work, and box-work taken out from two lines in curve near water-level. Richer work has before been taken out, but obtaining it so auriferous, and at so deep a horizon, is a most promising and encouraging feature for the future of Maquine. First division of February (extract from letter of Feb. 17):—"Produce cleaned to date, 7821 oits. Works are proceeding with usual regularity, and stopes yielding well. Box work has been taken out from curve, good duty is being done at Treloar's level, and progress making at deep adit. At Tambor we are driving westward in jacotinga of most promising appearance, but as yet not auriferous. Before my next I hope to prosecute sinking by means of a Californian pump to drain water."

ANGLO-BRAZILIAN.—Mr. F. S. Symons reports:—The produce for January, 1705 oits., at 9s., 767*l.*; cost, 1451*l.*—loss, 684*l.* The gold returns for January amount to 1705 oits. only, and I am sorry to announce a loss of 684*l.* on the month. The main circumstance that has militated against us has been the almost total cutting out by killas of our best body of lode in stopes from Dawson's shaft, and also in Dawson's canoa. By continuing Dawson's shaft we hope to encounter lode beyond this mass of killas; it will therefore be pushed on with all speed, altogether with Haymen's and Foster's. At both of these the indications are favourable. In the latter shaft the lode at the beginning of last month was 1 foot wide, now it is 3 feet, and we have hopes of this section proving remunerative, as the Fundao lodes will all be intersected by this shaft. In Haymen's, also, the lode is improving. Operations are being carried on in the Buraco Secco, and I hope soon to be able to advise an amelioration in the quality of the stone. This has been one of our richest spots, and we have every reason to suppose that it will regain its auriferous quality, seeing that the lode maintains its size, and that fluctuations to as great an extent have before occurred.

SAO VICENTE.—The following has been received from the company's superintendent in Brazil, dated Feb. 17:—We have finished sampling the No. 2 cross-cut, without finding any gold. We have commenced extending west on the bed of jacotinga referred to on Jan. 17, and continue to extend the cross-cut. In the end at present there is a small line of jacotinga. The works at Phillip's shaft (eastern section, quartz mine) the inclined plane and the tram-road are progressing favourably. I hope by the end of the month nearly everything will be in readiness for drawing the ores from the mine.

ANGLO-ARGENTINE.—Mr. Barnard, the company's superintendent, writes, under date of Jan. 20, that Capt. Vivian's examination of the gold mines continues to be thoroughly satisfactory to him.

ROSSA GRANDE.—Mr. E. Hilcke reports—The produce for January amounts to 949 oits. of gold, and that the operations have been carried on with regularity. Under date Feb. 16, Mr. Hilcke, adds:—At Mina de Serra the lode in the 40 fm. level east is greatly improving again, and that in the stopes below this level and in the 50 fm. level east is maintaining its good appearance.

TAQUARIL.—Mr. Richards (Feb. 14) reports—In our mining operations we continue to make satisfactory progress. The shallow adit has been driven since the 1st 20 fathoms, making the total distance of 79 fathoms. We have now only 16 fathoms to communicate with the engine-shaft, which will be effected in the course of another week. During the last two days there has been a want of air in the end, and we are now putting in air-pipes; 25 fathoms will be required, and 10 fathoms are already fixed. The sump-shaft has been sunk 28 fathoms from the surface, and after communicating with the shallow adit we shall only have 11 fathoms to sink to reach the bottom of the old workings. Capt. Pengilly calculates, and I think with every reason, on completing the shaft before the end of June at the farthest—in all probability long before.—Deep Adit: The ground in this adit continues very hard, and we are making but little progress at present. You are aware that this adit was driven on the course of the lode 21 fathoms; finding the ground very hard, a cross-cut through the lode was commenced, in the hope of finding the ground more favourable on the south side; 7 fathoms have been driven in this cross-cut without reaching the south wall. The rock is very hard, but Capt. Pengilly has hopes of getting through it and into more favourable ground in a few days.—Machinery: I have mentioned above that there is every probability of our being able to sink the sump-shaft down to bottom of the old working at the latest by the end of June.

PESTARENA.—T. Roberts, March 17: The lode in the end of the 46, south of Aquavite engine-shaft, yields now 8 tons of ore per fathom, and during the past week we have made with the mills some trials of this ore, and find it to give 1 oz. of gold per ton; we expect a further improvement in this end shortly. At Val Toppa no change. We have had more snow at Pestarena this month than we had before for the whole of the winter.

LUSITANIAN.—March 15: In sinking Taylor's engine-shaft below the 120 the lode in the stopes is worth 2 tons per fathom. The shaft is now down to the 130, ready to begin to drive the levels east and west of the shaft on the course of the lode. In sinking River shaft below the 100 the lode is 1½ ft. wide, composed of flookan. No. 77 winze, sinking below the 110, on Basto's lode, is holed to the 120 fm. level. In No. 76 winze, sinking below the 28, west of Perez' shaft, on Basto's lode, the lode is 1 foot wide, composed of flookan and country.—Levels on Basto's Lode: In the 130, east of Taylor's, the lode is now worth 1 ton per fathom. In the 130, west of Taylor's, the lode is worth 1 ton per fathom. In the 120, east of ditto, the lode is 2½ ft. wide, composed of loose quartz and country, containing stones of ore. In the 120, west of Taylor's, the lode is 2 feet wide, composed of loose country and quartz. In the 110, west of ditto, the lode is 2½ ft. wide, composed of hard quartz. In the 90, east of River shaft, the lode is 1½ foot wide, composed of a dry flookan. In the 70, east of ditto, there are men clearing the 8 fm. level, and assisting to put in a new railroad. In the 38, west of Perez' shaft, the lode is 6 in. wide, composed of flookan.—Levels on the Branch: In the 18, west of the cross-cut, west of Perez' shaft, the lode is 1 ft. wide, and has a branch of ore worth ¼ ton per fathom. In the 18, east of ditto, the lode is 1 ft. wide, with a branch composed of copper ore and nickle, worth ½ ton per fathom. In the 8, west of Perez' shaft, the lode is 9 in. wide, and worth ½ ton per fathom. In the adit level, west of ditto, the lode is 6 in. wide, worth ½ ton per fathom.—Levels on Ponte Lode: In the 28, east of the slide, the lode is 6 in. wide, composed of quartz. In the adit level, west of Perez' shaft, the lode is 4 in. wide, yielding small stones of ore.—Cross-cuts: In the 60 fm. level cross-cut, north of River shaft, the ground is hard gneiss. In the 28 fm. level cross-cut, south of Basto's lode, west of Perez' shaft, the ground is a hard fine gneiss.—Carvalhal: In sinking the incline shaft below the 40 there is no lode in the shaft to value. In sinking No. 9 winze below the 20, east of incline shaft, the lode is worth 1 ton per fathom for lead and blende.—Levels on Great Lode: In the 40, east of incline shaft, the lode is worth ¾ ton per fathom for lead and blende. In the 30, east of ditto, the lode is worth 1½ ton per fathom for blende. In the 20, east of ditto, the lode is now worth 2 tons per fathom for lead. In the 10, east of ditto, the lode is worth 1½ ton per fathom for lead.—Levels on North Lode: In the adit level, west of the River Caima, the lode is 1½ ft. wide, composed of flookan.

LONDON GENERAL OMNIBUS COMPANY.—The traffic receipts for the week ending March 21 amounted to 8886*l.* 19s. 5d.

AUSTRALIAN MINES.

YUDANAMUTANA COPPER.—The superintendent (Jan. 21) writes that he was then going up to the mine, in consequence of the small quantity of ore smelted, through the men having ceased working for some days at Christmas and the new year. Under date of Feb. 2 he telegraphed from Melrose (on his way down from the mine) to the secretary at Adelaide, as follows:—"Mine looking well; made and dispatched last week 14 tons of copper." The captain (January 25) reports—"Blinman Mine: The English mail leaving Adelaide on the 3d of next month necessitates the writing of my report a week before the month ends, therefore it condenses full particulars.—No. 1 Winze: The lode in the bottom of this winze is still holding good; the men have been stoping and rising this month, the lode looking as well, if not better, than last report.—No. 2 Winze: The lode in this winze remains good; the men have been working on caunter branches this month.—No. 3 Winze: I am pleased to say the lode in this place is still looking well; the men have been sinking the whole of the month, and the lode is as rich as last report.—No. 3, or Main Shaft: The men will finish their contract this week (10 fathoms); they have had a payable lode of ore all the way down. I shall put the men next month to strip down the shaft, which will enable me to discover where the several shoots of ore are running before I commence timbering the shaft, therefore shall not drive at present to hole to No. 1 winze. There must be an enormous quantity of ore in this shaft; the shoots of ore have not been seen before, and all dipping into whole ground north, which gives me a good opinion of it. The stopes in the back of the 10 and 25 are looking just the same. The bunch of ore south of No. 1 winze, below the 10, as mentioned in my last, is still looking well.—Smelting-Works: We have now four furnaces in full work. I hope to make large returns. The holidays were a great drawback to us for the time; now they are over, and the men have turned to work again in earnest. Copper ore raised and smelted for the three weeks, 284 tons, copper made, 32 tons 10 cwts. 3 qrs.; dispatched, 31 tons 8 cwts.; on hand, 1 ton 2 cwts. 3 qrs. Everything on the mine is going on quite satisfactorily. The mine never looked better than it does at the present time, plenty of good wood coming in, and every prospect for some time to come of our making large returns." The following particulars are contained in a supplementary letter:—The account sales of rough copper delivered to the English and Australian Copper Company (Limited) since last advices are—No. 47 parcel, 27 tons 16 cwts. 3 qrs., agreed percentage 95=2644½ units, at 3s. 10d., 1829*l.* 2s. 3d.; less wages, weighing, and sampling, 1*l.* 1s. 6d.; 1828*l.* 0s. 9d. There are now two lots in the hands of the English and Australian Copper Company—15 tons 16 cwts. 0 qr. 12 lbs. fully drawn against, 5 tons 6 cwts. 3 qrs. 22 lbs. not drawn against.

PORT PHILLIP AND COLONIAL GOLD.—Mr. Bland, Clunes, Jan. 30: The quantity of quartz crushed during the four weeks ending Jan. 6 amounted to 4399 tons; gold obtained, 1728 ozs. 9 dwts., or an average per ton of 7 dwts. 21 grs. The receipts were 6442*l.* 15s. 7d.; payments (including 1627*l.* 17s. 1d. paid on account of fire-wood and timber contracts), 5571*l.* 18s.; profit, 870*l.* 17s. 7d., added to which was last month's balance of 2269*l.* 14s. 11d., thereby making up available balance of 3140*l.* 12s. 6d. The amount divided between the two companies was 1500*l.*, the Port Phillip Company's proportion of which amounts to 975*l.* The balance of 1640*l.* 12s. 6d. was carried forward to next month's account. The return for three weeks ending Jan. 27 is—Quantity of quartz crushed, 3777 tons; gold obtained, 1207 ozs. 2 dwts., or an average of 6 dwts. 9 grs. per ton. Mr. Munday, at the conclusion of his mine report, states that, in reference to the yields lately obtained, it may be noticed that they have been low, in consequence of some of the better stopes having temporarily fallen off in yield, and there being rather more than the usual proportion of poorer stopes in operation. A slight change is purposed being made in the working, by which there is every probability of the returns being kept up to a remunerative average. The remittances received by this mail amount to 770*l.* 15s. 8d.

ENGLISH AND AUSTRALIAN COPPER.—Advices received from the sub-manager, dated Port Adelaide, Feb. 3:—The quantity of coal at Kooringa was about 340 tons, and at Port Adelaide 1220 tons. There were five furnaces and one refinery at work at Port Adelaide. The furnaces at the Burra would be re-lighted the first week in February, for the purpose of smelting the ores accumulated there. Since last advices a shipment of 50 tons copper had been made.

WORTHING.—Adelaide, Feb. 2: **I am glad to state that our prospects** for the future still look favourable. Since setting-day we have met with a slide in the engine-shaft, which has eased the ground considerably for sinking, so that I hope we shall be down to the 93 and commence to cut the plat early in next month. The lode in the north end at the 83 has been very good most of the month, and easy for driving; price varying from 5*l.* to 7*l.* per fathom; ground driven 19 feet 2 in. Also a piece of lode was stripped off the side of the level, at 2*l.* 5s. per cubic fathom, by the same pare of men during the month. The lode in the end at the present time is not quite so good for ore as in last month, but still a good paying lode; present price for driving 8*l.* per fathom. The rise in the back of the 83 continues hard in the north end of the rise, but in the south end we have a real good lode, so that we have set the men to lengthen the rise from 8 to 14 ft. long. This will give us a little more ore, and enable us to get on a little faster; ground risen in last month by two men, 8 feet 4 in.; present price, 25*l.* per 1 fm. high and 2 fms. 2 ft. long. The winze in the bottom of the 53 fm. level north continues hard, and not very good at present, but appears to be improving; ground sunk in the last month 9 feet 6 in.; present price 27*l.* per fathom. This is a bad place to work, the air being very dead, but we must push through and hole to the rise, in order to open up the north part of the mine. I am in hopes we shall not be long before we cut the slide in the 73 cross-cut, as we are beginning to meet with small veins of ore, and the water appears to increase in the end. The stopes are about the same as in months past, with the exception of what has been taken away; ore raised during the month 130 tons; copper shipped 15¼ tons; ore on hand 82 tons of 9 per cent., and regulus 20 tons of 50 per cent.; number of hands employed, 116.

AUSTRALIAN UNITED GOLD.—Mr. Kitto (Feb. 1) writes:—Machinery: The machinery has arrived at the respective railway stations to which I caused it to be sent from Melbourne—Malmsbury and Elphinstone—and nearly the whole of it placed at the mines for which it is intended without injury or mishap.—Duke of Cornwall Mine: You will be glad to hear that we have Cattle's lode in the cross-cut from Daukes's shaft; although we have driven 30 feet since it was cut we are not yet through it. Gold is visible in considerable quantities so far as we have gone, and is in much coarser pieces than in the bottom level of the old shaft, which is 10 fms. above, and more regularly distributed through the stone. I have before me now some scores of beautiful specimens of quartz and gold, far surpassing anything previously obtained from this mine. I anticipate some magnificent returns before the end of the present year. What we have now before us more than confirms any statement made in favour of this property before it was purchased by its present owners. Sharpe's shaft has reached the required depth to cross-cut for the lode, at the same level as in Daukes's shaft; the plat is cut, and driving commenced; no further sinking can be done until the new engine is at work.—Engine: The boiler has been fixed some time; the beam, or "bob," is in position, as also the cylinder, whilst the other portions will be arranged as rapidly as possible. Mr. Rowe anticipates the working of the engine before you receive this. I may here state that it gave me considerable satisfaction to find that Mr. Rowe reports every portion of the buildings erected to a nicety (for the reception of the machinery) seldom to be met with, the more especially in the absence of the engineer. It is the more gratifying to me that such is the case, as not a single workman engaged in connection with it ever saw a Cornish engine-house before.—Central Mine: Most of the machinery has arrived from the station. I have let the contract for the erection of the buildings to receive the engine. The necessary workshops are completed. I have nothing more to report in connection with the property, other than that I am informed that the London and Melbourne Company, working above us, are doing very well.

THE MANUFACTURE OF WATCHES AND CLOCKS.—A most interesting and instructive little work, describing briefly, but with great clearness, the rise and progress of watch and clock making, has just been published by Mr. J. W. Benson, of 25, Old Bond-street, 99, Westbourne-grove, and the City Steam Factory, 58 and 60, Ludgate-hill. The book, which is profusely illustrated, gives a full description of the various kinds of watches and clocks, with their prices, and no one should make a purchase without visiting the above establishments or consulting this truly valuable work. By its aid persons residing in any part of the United Kingdom, India, or the Colonies, are enabled to select for themselves the watch best adapted for their use, and have it sent to them with perfect safety. Mr. Benson, who holds the appointment to the Prince of Wales, sends this pamphlet to any address on receipt of two postage stamps, and we cannot too strongly recommend it to the notice of the intending purchaser.

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London: Printed by RICHARD MIDDLETON, and published by HENRY ENGLISH (the proprietors), at their offices, 26, FLEET STREET, E.C., where all communications are requested to be addressed.—*March* 27, 1869.